Unit (I) lesson (I)

Living systems Adapt and survive

Some problems affect survival of organisms

Such as 1-high or low temperature 2- high or low water

تؤثر بعض المشكلات علي حياه الكائن الحي مثل 1- ارتفاع درجه الحراره او انخفاضها 2- ندره الماء او وفرتها

Animals and plants adapt to environmental changes in order to survive

1-Activity (1) Desert agma lizards سحالي الصحراء

Starred agama lizard that lives in the desert protects itself by finding shaded area during a hot sunny day to keep its body cool

تحمي سحلية العجمة التي تعيش في الصحراء نفسها من خلال إيجاد منطقة مظللة خلال يوم مشمس حار للحفاظ على جسدها باردًا

Palm leaves are covered with waxy layer to protect them from extreme hot climate

أوراق النخيل مغطاة بطبقة شمعية لحمايتها من المناخ شديد الحرارة

Human protects himself from extreme hot climate by using umbrella and light clothes

الإنسان يحمي نفسه من المناخ شديد الحرارة باستخدام المظلة والملابس الخفيفة

Adaptation It is the characteristics that help living things survive and reproduce in an ecosystem

التكيف هو الخصائص التي تساعد الكائنات الحية على البقاء والتكاثر في النظام البيئي

2- Act2ivity (2) penguin feet اقدام البطريق

Adaptation of penguins to survive in cold environment

Penguins cannot fly but they can stand on ice all day

لاستطيع طيور البطريق الطيران ولكن يمكنها الوقوف على الجليد طوال اليوم

Habitat: Penguin in Antarctica lives in a polar one of the coldest places on the Earth .

•الموطن: يعيش البطريق في القارة القطبية الجنوبية في منطقة قطبية واحدة من أبرد الأماكن على وجه الأرض .

Adaptation Its body تكيف جسم البطريق:

A-Its body is covered with جسد البطريق مغطى :

1-dense feathers بالريش الكثيف

2-a thick layer of fat (G.R.) to keep its body warm .

-طبقة سميكة من الدهون لإبقاء جسمه دافئًا .

B-Its feet : Penguin's feet have no feathers

قدم البطريق: قدم البطريق ليس لها ريش

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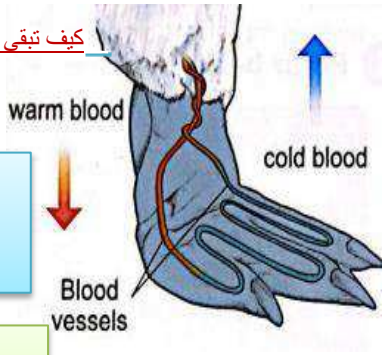
How do the penguin's feet stay warm ? كيف تبقى أقدام البطريق دافئة؟

Due to the way of moving the blood in blood vessels

بسبب طريقة تحريك الدم في الأوعية الدموية

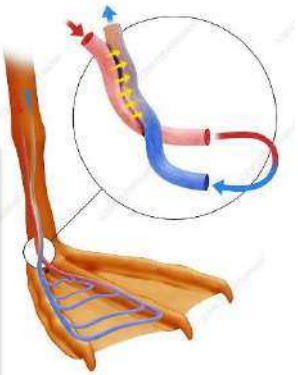


1-Blood vessels bring cold blood up from the feet.

1-الأوعية الدموية تصعد الدم البارد من القدمين

2 -Other blood vessels bring warm blood down to the feet from the feather - coated body

2-. الأوعية الدموية الأخرى تسحب الدم الدافئ إلى القدمين من الجسم المغطى بالريش



3-These vessels weave around each other.

When they touch, the warm blood vessels heat up the cold blood vessels, so the heat transfers to the penguin's feet

3- هذه الأوعية تلتف حول بعضها البعض .عندما تلامس الأوعية الدموية الدافئة تسخن الأوعية الدموية الباردة ، وبالتالي تنتقل الحرارة إلى قدمي البطريق

This means that the blood moving up into the penguin's body is not cold and the blood moving down to the penguin's toes is warm enough to keep its toes from freezing .

هذا يعني أن الدم الذي يتحرك لأعلى إلى جسم البطريق ليس باردًا وأن الدم الذي يتحرك لأسفل إلى أصابع البطريق يكون دافئًا بدرجة كافية لمنع أصابع قدميه من التجمد.

Give reason for

Penguins ' feet help them survive in cold climate

Because warm blood from the body weave around the blood vessels that carry cold blood from the feet . This leads to warming the blood vessels of the penguin's feet to survive in cold climate

تساعد أقدام طيور البطريق على البقاء على قيد الحياة في المناخ البارد لأن الأوعية الدموية التي تحمل الدم الدافئ من الجسم تلتف حول الأوعية الدموية التي تحمل الدم البارد من القدمين .هذا يؤدي إلى تدفئة الأوعية الدموية لأقدام البطريق للبقاء على قيد الحياة في المناخ البارد

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3- Activity (3) Adapt to survive

التكيف من اجل البقاء

1-The polar bear الدب القطبي Habitat Arctic region في المنطقة القطبية	is has white fur that helps it to hide in snow from prey while hunting ويتميز بالفرو الابيض الذي يساعده على التخفي بين الثلوج من الفريسة اثناء الصيد	
2-The brown bear الدب البني 3-The dark bear الدب الاسود Habitat forests في الغابات	It is has dark fur, which helps it to hide in the trees while hunting : يتميز بالفرو الداكن الذي يساعده علي التخفي بين الاشجار اثناء الصيد	
4-Caracal عناق الارض 5- Fennec fox ثعلب الفنك Habitat desert في الصحراء	It has sandy-colored (Tan) fur to hide in the desert له فراء ذهبي للتخفي في الصحراء 	
6- Lizards السحالي Habitat في الصحراء desert	they have colored scales to hide in the colored rocks in the desert : لها حراشيف ملونه تساعدها علي التخفي بين الصخور الملونه في الصحراء	

Camouflage It is a type of adaptation that some animals use to hide from their predators or their preys by blending in with the surrounding environments.

التمويه هو نوع من التكيف تستخدمه بعض الحيوانات للاختباء من مفترساتها أو فرائسها من خلال الاندماج مع البيئات المحيطة

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Temperature	درجة الحرارة	finding	البحث عن
Desert	صحراء	shaded area	منطقة ظل
lizards	سحالي	Penguins	طيور البطريق
Palm	نخيل	reproduce	تتكاثر
hot climate	مناخ حار	protects	تحمي(تحافظ)
survive	البقاء	hot sunny day	يوم مشمس حار
Adaptation	التكيف	Antarctica	أنتاركتيكا
Cool	بارد	feet	أقدام
polar	قطبي	Blood vessels	أوعية دموية
dense feathers	ريش كثيف	Habitat	الموطن
polar bear	دب قطبي	hide	الاختباء
Arctic region	منطقة القطب الشمالي	Camouflage	التمويه
white fur	فراء أبيض	scales	حراشف

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(1.1)Concept

Exercises on Lesson (1)

1-Choose the correct answer?

1. Adaptation helps the living organism in all the following characters , except…

a . surviving b . reproduction . c . hiding d . death..

2. The starred agama keeps cool during a hot sunny day in desert by

a . eating green vegetables . b . drinking more water .

c . secreting more sweat . d . finding a shade area .

3. If you catch a piece of ice in your hand , you will lose feeling in your fingers after a few…..

a . minutes b . hours c. days d . weeks

4. Penguins live in a polar climate which……

a.is one of the hottest places on Earth b . is one of the coldest places on Earth

c . looks like the desert climate d . looks like the forest climate .

5-Which of the following ways help penguins to adapt to live in polar climate ?.

a. Their bodies are covered with skin

b. Their bodies are covered with dense feathers only.

c. Their bodies are covered with a thick layer of fat only

d. Their bodies are covered with dense feathers and a thick layer of fat

6. In penguin's feet , ……..

a . Warm blood vessels wave around cold blood vessels

b . Warm blood vessels wave around its toes

C. Cold blood vessels wave around its toes

d . Cold blood vessels wave around dense feathers [1]

7. Penguin's feet have blood vessels that bring… up from its feet towards its body

a . Cold water b . Warm water C. cold blood d . Warm blood

8. The presence of a thick white fur is an adaptation in ……..

a . Starred agama lizard b . polar bear . c . Fennec fox d . Forest bear

9. Bears that live in forests have fur ... that of polar bears .

a , whiter than b . darker than c . similar to d . brighter than

10. Fennec fox and caracal have ……that help them blend in with desert landscape

a . colorful scales b . thick white fur

c . sandy - colored feathers d . sandy - colored fur

11-Desert lizards have……. that make them hide among the colorful rocks in the desert

a. tan-colored fur b. colored scales c. sandy colored feathers d. dark fur

12-Camouflage means that the animal ……

a. can be seen easily among its surrounding environment

b. is hard to be seen among its surrounding environment.

c. is easily to be seen by its preys d. can be seen easily by its predators.

13-Which of the following birds is more difficult to be seen by its predator .

a. A red bird on a green tree b. A blue bird on a green tree

c. A yellow bird on a green tree. d. A green bird on a green tree.

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2-moose from columns (B) and (C) what suit them in column (A)

A) Animal	A) Adaptation	C) Helps it to…….
1-Penguin	a, has dark fur	A. stay warm and hide from preys
2-Caracal	b. has thick white fur	B. keep its body warm
3-Brown bear	c. has thick layer of fat and dense feathers	C. blend in with desert landscapes
4-Polar bear	d. has sandy-colored fur	D. hide among the trees when it

1-……/ …… 2- ……/…… 3-……/…….. 4-……/…….

3-Put (√) or (x) :

1. The desert lizard blend in with large green trees , to hide from its enemies. ( )
2. Animals that live in hot deserts have special ways to keep their bodies cool during hot sunny days . ( )
3. Living organisms can survive and reproduce in different environments by the help of adaptation . ( )
4. Penguin's body cover with dense feathers and thin layer of fat to keep its body warm ( )
5. Thick white fur is an adaptation in bears that live in polar regions . ( )
6. The sandy - colored fur of caracal helps it blend in with snow in polar environment ( )
7-. Some types of lizards have colored feathers to help them blend in with rocks in their ecosystem . ( )

4-Complete the following sentences by using these words

(camouflage-habitat-adaptation - predator-prey)

1-The environment where living organisms live in is called……..

2. An animal that hunts and eats another animal is called a…….. while……. is an animal that is hunted and eaten by another animal

3. The characteristic that helps living organisms to survive and reproduce in the ecosystem is known as……

4-Type of adaptation that some animals use to hide from their predators or their preys is known as…….

5-Write the scientific term of each of the following

1-A characteristic that helps living organisms to survive and reproduce in the ecosystem in which they live (……..)

2-A bird that has a thick layer of fat and dense feathers to adapt extreme cold weather (……..)

3-It covers the body of some types of bears to blend in with snow and keeps their bodies warm. (……..)

4. A type of foxes that has sandy-colored fur to adapt its desert environment (……..)

5-A property that helps animals to blend in with their surrounding environment (……..)

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6.Complete the following sentences :

1-The penguin's body can keep warm through a thick layer of …… and dense…….

2. A penguin can stand around on ice all day due to the weaving of ..... around each other in its feet.

3. Forest bears have …….or……colored fur colored fur , while polar bears have …….. colored fur

4. In desert environment ……and ……., are covered with sandy –colored fur

5. Among animals that can live in desert ecosystem are …….lizard and ……. fox .

6. The fur of a polar bear is thick to keep its body…… in polar climate while it has …… color to blend in with snow.

7. The body of some types of lizards are covered with …….. to blend in with colored rocks in their environment .

8. Among animals that can live in polar environment are …….and …….

9. Animals can blend in with their surrounding environment to hide from their …….and preys through ……property .

7- Give reasons for :

1. The starred agama lizard always looking for shade areas in desert .

……

2. The penguin's body has an insulating layer of fat and thick downy feathers

……

3. The blood vessels in the penguin's feet weave around each other

……

4-Some desert lizards have colorful scales

……

5-Fennec fox has sandy-colored fur, while polar bear has a white fur .

……

6-Some animals have the ability to make camouflage adaptation.

……

8 What happens if ... ?

1. The warm blood vessels and cold blood vessels in the penguin's feet are not weaved around each other. ……

2. The polar bear has a thin fur instead of its thick fur .

……

3. The body of fennec fox is covered with a black fur .

……

4. Some types of lizards don't have the camouflage adaptation .

……

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lesson (2) Types of badaptation

1. Structural adaptation تكيف تركيبي	2. Behavioral adaptation تكيف سلوكي
It is a change in the body structure of a living organism to help it survive إنه تغيير في تركيب جسم الكائن الحي لمساعدته على البقاء	It is a change in the behaviors or acts of a living organism to help it survive . إنه تغيير في سلوكيات أو أفعال الكائن الحي لمساعدته على البقاء
Examples • The blood vessels in the penguin's feet The thick fur of the polar bear • الأوعية الدموية في قدم البطريق .الفراء السميك للدب القطبي	Examples • Desert lizard looks for shade during hot sunny days. • Migration of some animals towards certain regions سحلية الصحراء تبحث عن الظل خلال الأيام المشمسة الحارة. هجرة بعض الحيوانات نحو مناطق معينة

1-Adaptation of fennec fox تكيف ثعلب الفنك

Habitat المعيشة	Structural adaptation تكيف تركيبي	. Behavioral adaptation تكيف سلوكي
Hot dry desert 	It has a tan-colored coat (sandy-colored fur) that: provides لها غطاء بلون أسمر (فرو بلون رملي camouflage to hide in a sandy, rocky environment يوفر التمويه للاختباء في بيئة صخرية رملية protects it from the hot Sun. يقيها من حرارة الشمس It has extra-large ears to help it lose the heat to cool its body له آذان كبيرتان للغاية لمساعدته على فقدان الحرارة لتبريد جسمه.	It pants like dogs to cool its body, where it takes up to 700 breaths per minute إنها تلهث مثل الكلاب لتبريد جسدها ، حيث تستغرق ما يصل إلى 700 نفس في الدقيقة It lives in burrows to stay cool during the sunny days. يعيش في الجحور ليبقى بارد خلال الأيام المشمسة It eats all kinds of food like insects, fruit, plant roots and even the remains from another animal's prey .يأكل جميع أنواع الطعام مثل الحشرات والفواكه وجذور النباتات وحتى بقايا فريسة حيوان آخر

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2- Adaptation of Arctic fox الثعلب القطبي

Habitat المعيشة	. Structural adaptation تكيف تركيبي	Behavioral adaptation تكيف سلوكي
Tundra desert with temperature as cold as (50°C) below zero in the winter months مع درجة حرارة تصل إلى (50 درجة مئوية) تحت الصفر في أشهر الشتاء	It has a thick fur coat to keep its body warm in cold climate لها فراء سميك للحفاظ على دفء جسمها في المناخ شديد البرودة Its fur coat is white during winter but turns brown in summer when the snow melts to help معطف فروها أبيض خلال الشتاء ولكنه يتحول إلى اللون البني في الصيف عندما يذوب الثلج it sneak up on prey in any season It has short ears and legs to help it stay warm -لمساعدتها على التسلل على الفريسة في أي موسم لها آذان وأرجل قصيرة تساعدها على البقاء دافئة	It lives in burrows to stay warm at night It eats all kinds of food like insects, fruit, plant roots and even the remains from another animal's prey تعيش في الجحور ليبقى دافئًا في الليل يأكل جميع أنواع الطعام مثل الحشرات والفواكه وجذور النباتات وحتى بقايا فريسة حيوان آخر

Give reason?

Both fennec fox in hot dry desert and arctic fox in cold tundra eat all kinds of food?

كل من الثعلب الفنك في الصحراء الجافة الحارة والثعلب القطبي في التندرا الباردة يأكلون جميع أنواع الطعام؟

Because it is hard to find food in the hot dry desert and in the cold tundra

لأنه من الصعب العثور على طعام في الصحراء الحارة والجافة وفي التندرا الباردة

3-Adaptation of Bull shark

has the ability to live in fresh and salt water

قرش الثور له قدره علي العيش في المياه العذبه والمالح

Habitat	Structural adaptation	Behavioral adaptation
Fresh water and salt water	It uses a camouflage strategy called " counter-shading " color contrast تستخدم استراتيجية تمويه تسمى " تباين الالوان " where it has a dark back and white belly to sneak up on prey It has sharp teeth to cut prey's flesh ، حيث يكون لها ظهر داكن وبطن أبيض للتسلل إلى الفريسة. لها أسنان حادة لقطع لحم الفريسة	It eats different types of food as it lives in both fresh water and salt water . يأكل أنواعًا مختلفة من الطعام لأنه يعيش في كل من المياه العذبة والمياه المالحة . It hunts during the day and at night , so it can surprise prey يصطاد في النهار والليل ، لذلك يمكن أن يفاجئ الفريسة.

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Dark back like the bottom of the ocean in the shadows

الظهر داكن مثل قاع المحيط في الظلال

When an animal swims above in the ocean , it may not see the bull shark due to its Dark back.

عندما يسبح حيوان فوق المحيط ، قد لا يرى قرش الثور في الظل بسبب ظهره المظلم.

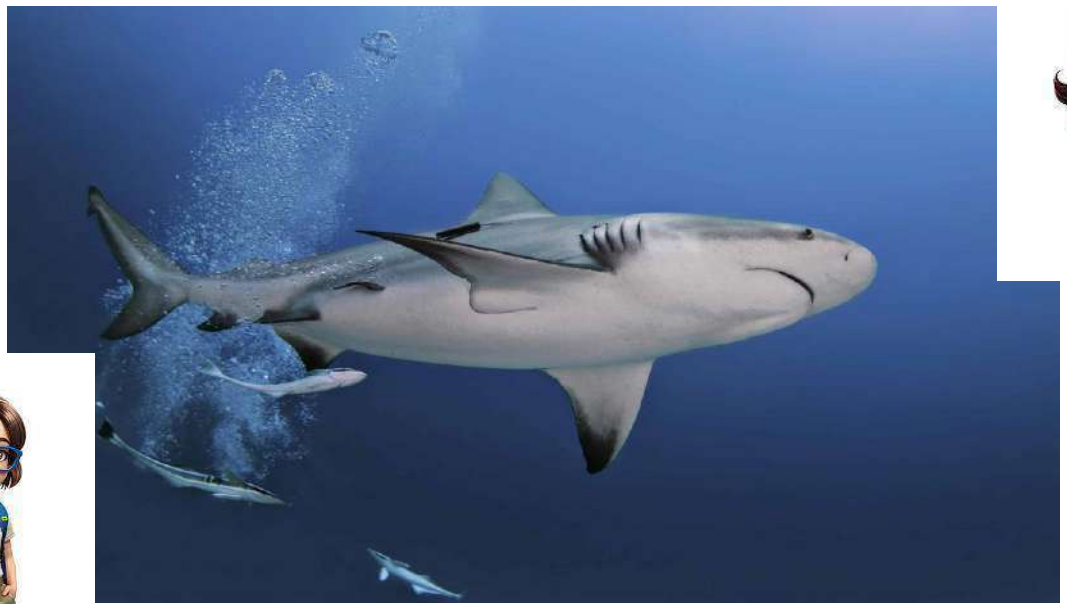
White belly like the bright light of the Sun بطن أبيض مثل نور الشمس الساطع

Structural adaptation التكيف التركيبي

When an animal swims underneath the bull shark and looking up , the bull shark may blend in with the bright light of the Sun due to its white belly .

عندما يسبح حيوان تحت قرش الثور وينظر لأعلى ، قد يختفى القرش الثور مع ضوء الشمس الساطع بسبب بطنه الأبيض.

Its body adapt to survive in fresh water where no other shark lives in fresh water



Activity (5)- Panther (Tiger) chameleon

حرباء النمر

It is cold-blooded animal to adapt to the environment

حيوان من ذوات الدم البارد لتتكيف مع البيئة

Lizards are from reptiles that are an - ancient type of animals found all over .the world in different environments

السحالي من الزواحف وهي نوع قديم من الحيوانات وجدت في مختلف بيئات العالم.

Bodies of reptiles are covered with scales such as starred agama lizard and .panther chameleon

أجسام الزواحف مغطاة بقشور مثل سحلية الأغاما النجمية وحرباء النمر.

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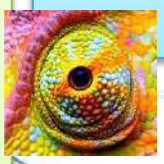
Structural adaptation التكيف التركيبي:

Chameleon eyes can face opposite directions, where each eye can move independently from the other, so

تستطيع عيون الحرباء أن تواجه اتجاهات معاكسة، حيث تستطيع كل عين أن تتحرك بشكل مستقل عن الأخرى

One eye can search for food like insects, while the other eye looks out for danger in a different direction

، وبالتالي:تستطيع إحدى العينين البحث عن الطعام مثل الحشرات، بينما تبحث العين الأخرى عن الخطر في اتجاه مختلف.



Chameleon has brightly colored scales to help it make camouflage and hide between green leaves and colorful flowers

تتمتع الحرباء بقشور ذات ألوان زاهية تساعدها على التمويه والاختباء بين الأوراق الخضراء والزهور الملونة

Chameleon has V-shaped feet and a tail like a hand to hold tightly the branches of trees

تتمتع الحرباء بأقدام على شكل حرف V وذيل يشبه اليد لتمسك بإحكام بأغصان الأشجار.الملونة

Behavioral adaptation التكيف السلوكي:

When chameleon finds itself in danger, it doesn't have teeth or claws for defense, but it can scare its enemies by some other tricks such as

عندما يجد الحرباء نفسه في خطر، فإنه لا يمتلك أسنانًا أو مخالب للدفاع، ولكنه يستطيع تخويف أعدائه ببعض الحيل الأخرى مثل:

1-It puffs up its body with air

ينفخ جسمه بالهواء

2- It opens its mouth wide

يفتح فمه على اتساعه

3- It changes the colors of its scales

يغير ألوان قشوره

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
puffs up	ينفخ	brightly colored scales	بقشور ذات ألوان زاهية
Behavioral adaptation	التكيف السلوكي	camouflage and	التمويه
Migration	الهجرة	hide between	الاختباء
Chameleon	الحرباء	green leaves	الأوراق الخضراء
search for food	البحث عن الطعام	colorful flowers	الزهور الملونة
insects	الحشرات	cold-blooded	ذوات الدم
danger	الخطر	reptiles	الزواحف
direction	اتجاه	White belly	بطن أبيض
adapt	تكيف	Dark back	الظهر داكن
environment	البيئة	counter-shading " color contrast	التظليل المضاد تباين الألوان""
camouflage	تمويه	winter	الشتاء
strategy	استراتيجية	summer	الصيف
brown	البني	sneak	التسلل

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Exercises on Lesson (2)

1-Choose the correct answer?

1. All of the following sentences represent the meanings of adaptation except…

a it is the characteristics that help living things survive .
b . it is the characteristics that help living things reproduce .
c . It is the changes that help the animal to find a prey .
d . it is the changes that causes the animal death .

2. The color of fur of fennec foxes protects them from

a. wind . b . rains . c. hot Sun d . cold weather .

3. Fennec foxes have a tan - colored coat that provides …… in their environments

a . camouflage b . respiration c . panting d . communication

4. Panting in fennec foxes belongs to ……. adaptation

a only structural b . only behavioral
c . both structural and behavioral d . neither structural nor behavioral

5. Fennec foxes and arctic foxes live in burrows this belongs to……. adaptation ,

a. only structural b. only behavioral
c . both structural and behavioral d . neither structural nor behavioral

6. All the following properties help fennec foxes to stay cool except

a thick fur coat b . make panting c. tan - colored coat d . extra - large ears .

7. Changing the color of body coat of arctic foxes according to season , is considered as a type of…….

a . Behavioral adaptation . b . change to the way of breathing .
c structural adaptation . d . change to the way of drinking .

8. All the following properties help arctic foxes to stay warm except

a. thick fur coat . b . short ears c. tan - colored d. short legs.

9. Both fennec foxes and arctic foxes are similar in all of the following except

a. they are live in the same habitat b . they can eat different things .
c . they have excellent hearing ability d . they have different sized ears .

10. Bull sharks can live in

a. fresh water only . b. salt water only .
c . seas , rivers and mud d . rivers , seas and oceans

11-one of structural adaptation of bull sharks is that they ……

a . can live in both salt water and fresh water .
b . are flexible about what they eat .
c . hunt in the day as well as the night .
d . can live in salt water only .

12. When a panther chameleon stands within leaves of trees , the color of its scales changes into ……. color .

a . white b . green c . blue d . black

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13. Special eyes of the panther chameleon are belong to…… adaptation .

a . only structural b . only behavioral

c . both structural and behavioral d . neither structural nor behavioral

14…… is considered as a behavioral adaptation in the panther chameleon

a. Puffing up its body during danger. b . Each eye can move independently

c . V - shaped feet d . Tail like a hand

15. All the following properties are considered as structural adaptations in the panther chameleon except its ... ……

a. each eye can move independently b. opening its mouth wide during danger .

c. V - shaped feet. d. long sticky tongue .

2 Choose from column (A) what suits it in both columns (B) and (C)

(A) Animal	(B) Adaptation	(C) How helps it
1. Chameleon	a . short ears and leg	A. stay cool
2. Fennec fox	b . V - shaped feet	B. stay warm
3. Arctic fox	c . difference in body colors	C. balance and movement
4. Bull shark	d . panting	D. hide from its prey

1 . ……/……. 2 . ……/……. 3……/……. 4. ……/…….

2-Put (√) or (x) :

1. Living organisms can adapt their environmental conditions through structural adaptation and behavioral adaptation . ( )

2. The behavioral adaptation is a change in the body structure of a living organism to survive. ( )

3. When the snow melts in polar regions, the thick fur coat of arctic fox turns black( )

4-The ears of arctic fox are larger than those of fennec fox. ( )

5. Fennec fox stays in burrows during day, while arctic fox stays in burrows at night . ( )

6. Both fennec and arctic foxes can eat insects, fruit, plant roots and the remains from other animal's prey. ( )

7-Fennec fox has sandy-colored fur to help it make camouflage. ( )

8. Arctic fox lives in tundra, while fennec fox lives in hot desert. ( )

9-Panting and staying in burrows are considered behavioral adaptations in fennec fox( ).

10-All types of sharks live in fresh water . ( )

11. If a bull shark moves from a river to a sea, it will die

12-Bull shark uses countershading camouflage to sneak up on its prey ( )

13-Chameleon uses its tail and V-shaped feet to hunt and move. ( )

14-The panther chameleon has teeth and claws, through which it can hunt and eat its prey( )

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15-Starred agama lizard use one of its eyes for searching for food and the other one to look out for danger. ( )

4-Complete the following table :

Animal	Its adaptation	Structural or Behavioral adaptation
1. …….	Blood vessels weave around each other	…….
2. . Polar bear	Has thick , white fur	Structural
3. …….	Changes the color of its fur	…….
4. …… fox	Hiding inside burrows to stay cool	…….
5. Panther chameleon	Has eyes face opposite directions	…….

5-Write the scientific term of each of the following : -

1- A change in the body structure of a ling organisms to survive (…….)

2 A change in the behaviors or acts of a thing organism to survive (…….)

3. An animal has a tan-colored fur and panting like dogs survive (……..…….)

4. A way by which fennec fox cools itself like dogs (…….)

5. An animal that changes its for color between winter and summer seasons (…….)

6. A lizard that has multiple bright colored scales to provide camouflage in its environment and has V-shaped feet (…….)

7. A shape of feet by which a panther chameleon holds tightly to branches of trees (……..)

8. A feature in the bull shark, in which the upper surface of to body darker than its lower surface (…….)

7 Give reasons for :

1. The fennec fox has a tan - colored coat .

……

2. Fennec foxes undergo panting ,

……

3-Arctic fox has a thick fur coat

……

4-The fur of arctic fox is white during winter but it turns brown in summer

……

5-Burrow is an excellent place for arctic and fennec foxes

……

6-Fennec fox has extra-large ears, while arctic fox has short ears

……

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7-Bull sharks have less competition for finding food in fresh water

……

8-Panther chameleon has V-shaped feet and a long tail.

……

8- What happens if ... ?

1. Arctic fox has brown coat during the winter but it turns white during summer

……

2. Fennec foxes have short ears.

……

3. Sense of hearing becomes weak in foxes .

……

4. Arctic fox has only a white coat during all seasons of the year .

……

5. Both eyes of panther chameleon move in one direction only .

……

6. Panther chameleon is exposed to danger .

……

9-Cross out the odd word

1-Penguin - Polar bear - Fennec fox - Arctic fox (……)

2-Fennec fox - Starred agama lizard - Panther chameleon- Bull shark (……)

3-Panther chameleon - Polar bear - Fennec fox - Arctic fox (……)

10-Put (S) in front of structural adaptation and (B) in front of behavior for each of the following statements

1-Tan-colored coat of fennec fox (…….)

2-Living of the arctic fox in burrows(…….)

3-Living of bull shark in both salt water and fresh water(…….)

4-Countershading of bull shark(…….)

5-V-shaped feet of panther chameleon(…….)

6-Change the colors of panther chameleon scales in danger cases(…….)

11-Give only one example of behavioral adaptation in each of the following

1-Fennec fox (……) 2-Starred agama lizard (……..……)

3-Bull shark (……..……) 4-Panther chameleon (……..……)

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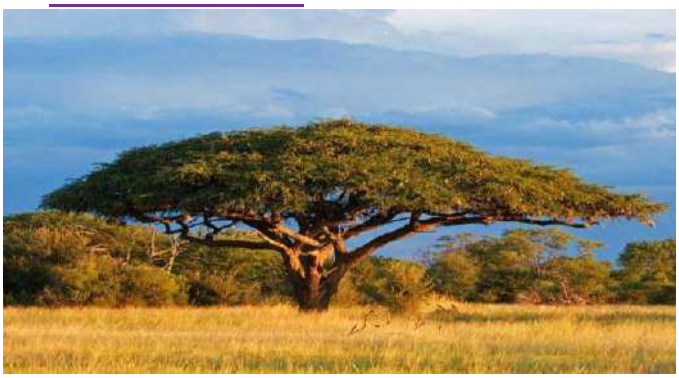
lesson (3) plant Adaptations

- Plants have structural and behavioral adaptations that help them survive and grow in their environments

Now, we will study two terrific trees which are

Savannah forest	Amazon forest
Ex Southern Africa	Ex Amazon rainforest of Brazil
Acacia tree lives in savannah forest in Southern Africa	Kapok tree lives in Amazon rainforest of Brazil.
there is one large tree scattered through out the landscape which is Acacia tree (umbrella-shaped tree), أن ترى شجرة كبيرة متناثرة عبر المناظر الطبيعية وهي شجرة الأكاسيا (شجرة على شكل مظلة) ،	The trees in the rainforest grow up to 70 meters tall, kapok tree (umbrella-shaped tree). : - تنمو الأشجار في الغابة المطيرة حتى ارتفاع 70 مترًا ، وهي شجرة الكابوك (شجرة على شكل مظلة).
It is a grassland habitat with mild temperature there is extreme lack of water موطنًا للأراضي العشبية مع حرارة معتدلة- هناك نقص شديد في المياه	rainy most of the year so it is easy to find water by strong winds تهطل الأمطار معظم أيام السنة يسهل العثور على المياه- - برياح قوية
Most of large plants. can't grow because has drought conditions, معظم النباتات الكبيرة .لا يمكن أن تنمو لأن تعاني من ظروف الجفاف.	- is hard for plants in the rainforest to reach sunlight. يصعب على النباتات في الغابات المطيرة الوصول إلى ضوء الشمس.
- The temperature in the savannah forest is mild, درجة الحرارة في غابات السافانا معتدلة	- The rainforest has a soggy soil which means that it is a wet muddy soil. . - تربة الغابات المطيرة رطبة مما يعني أنها تربة طينية رطبة

Acacia tree



Kapok trees

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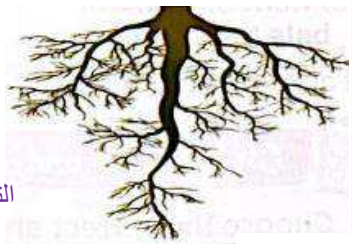
Adaptation of trees to survive with their environment

1. Acacia tree (umbrella-shaped tree)

Its habitat: in savannah forest in Southern Africa.

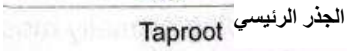
1. شجرة الأكاسيا (شجرة على شكل مظلة) موطنها: تنمو في غابات السافانا في جنوب إفريقيا. تكيفها

Its structural adaptation :



Root - It has a very long root grows directly downward known as the "tap-root" searches for water as deep as 35 meters below the soil.].

التكيف التركيبي : الجذر - له جذر طويل جدًا ينمو مباشرة إلى أسفل يُعرف باسم "الجذر الرئيسي". - يبحث هذا الجذر عن المياه حتى عمق 35 مترًا تحت سطح التربة.



الجذر الرئيسي Taproot

Trunk - Its trunk is very long, so most animals except giraffe cannot reach its leaves to feed on.

- Acacia tree stores water in its trunk.

الجذع - جذعها طويل جدًا ، لذا فإن معظم الحيوانات باستثناء الزرافة لا تستطيع الوصول إلى أوراقها لتتغذى عليها. - شجرة الأكاسيا تخزن الماء في جذعها

Leaves - It has tiny leaves to help it hold in water, while soaking up sunlight needed to make food.

- Its leaves have sharp spines to protect them from hungry animals.

الأوراق - لها أوراق صغيرة تنمو فوقها لتساعدها على الاحتفاظ بالماء ، بينما تمتص أشعة الشمس اللازمة لصنع الطعام. - أوراقها ذات أشواك حادة تحميها من جوع الحيوانات.

Its behavioral adaptation: can defend itself as follows

تكيفه السلوكي: يمكن لشجرة الأكاسيا أن تدافع عن نفسها كما يلي:

- When an animal begins eating the leaves of the acacia, the tree also begins to produce a poison that makes the leaves taste very bad.

عندما يبدأ الحيوان في أكل أوراق السنط ، تبدأ الشجرة أيضًا في إنتاج سم يجعل الأوراق مذاقًا سيئًا للغاية.

-Then it sends a smelly message in the wind to acacia trees nearby telling them to start making the same poison.

- ثم ترسل رسالة كريهة الرائحة في مهب الريح إلى أشجار السنط القريبة تخبرهم أن يبدأوا في صنع السم نفسه.

2- Kapok tree (umbrella-shaped tree)

• Its habitat: It grows in the Amazon rainforest of Brazil,

شجرة الكابوك (شجرة مظلة) موطنها: تنمو في غابات الأمازون المطيرة بالبرازيل

• Its structural adaptation: -

1-Root firmly rooted due to large, wide roots called buttress roots.

تكيفها التركيبي: الجذر. تبقى شجرة الكابوك متجذرة بقوة بسبب الجذور الكبيرة والعريضة التي تسمى جذور الدعامة

- Buttress roots they grow high up on its trunk to hold the tree firmly in the soggy soil.

جذور الدعامة تنمو عالياً على جذعها لتثبيت الشجرة بقوة في التربة الرطبة.

- Some of these roots can start up to 5 meters above the ground

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- يمكن أن يصل ارتفاع بعض هذه الجذور إلى 5 أمتار فوق سطح الأرض..

2-Leaves It has hand-shaped leaves with narrow parts that allow wind to move more gently through the leaves without tearing them.

الأوراق لها أوراق على شكل يد بأجزاء ضيقة تسمح للرياح بالتحرك بلطف أكثر عبر الأوراق دون تمزيقها.

• Its behavioral adaptation: - The kapok tree uses the wind to send a different type of messages than the acacia,

The kapok tree invites bats to come visit its delicious-smelling flowers through these smelly messages.

☼- Kapok tree has fluffy yellow seeds to be easily carried by wind across the forest ..

• تكيفه السلوكي:

- تستخدم شجرة الكابوك الرياح لإرسال نوع مختلف من الرسائل عن أكاسيا ، حيث تدعو شجرة الكابوك الخفافيش لزيارة أزهارها ذات الرائحة اللذيذة من خلال هذه الرسائل ذات الرائحة الكريهة. أوراق شجرة الكابوك

-☼تحتوي شجرة الكابوك على بذور صفراء رقيقة يسهل حملها بواسطة الرياح عبر الغابة ...

Adaptation of some plants

Plant and Its habitat		Its structure adaptation	Reason
Mangrove tree شجرة المانجروف Salt water		Long and strong roots جذور طويله وقوية	To resist water waves لمقاومه تيارات الماء
Water lily wetland		Wide leaves أوراق واسعة float on the water surface تطفو على سطح الماء	To absorb a big amount of sunlight لامتصاص كمية كبيرة من ضوء الشمس
Palm tree النخل desert		Thick root Small leaves جذور سميكة واوراق صغيرة	To resist the strong wind لمقاومه الرياح القوية
Pine الصنوبر Snow		Leaves change to spins تحور الورق الي شوك - a triangular shape and short branches.	To prevent animals to eat it لمنع الحيوانات من اكلها To allow the snow to slide easily over it
Barbary fig التين الشوكي Desert		Has sharp spins لها اشواك حادة	To prevent animals to eat it لمنع الحيوانات من اكلها

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Savannah forest	غابات السافانا	Buttress roots	جذور داعمة
Amazon forest	غابات الأمازون	tap-root	جذر وتدي
Southern Africa	جنوب أفريقيا	hold	يحتفظ
rainforest	غابات مطيرة	stores water	يخزن الماء
Acacia tree	شجرة الأكاسيا	sharp spines	أشواك حادة
Kapok tree	شجرة الكابوك	firmly rooted	جذور راسخة
muddy soil	تربة موحلة	poison	سم
umbrella-shaped	مظلة	messages	رسائل
landscape	مناظر طبيعية	delicious	لذيذة
drought conditions	ظروف الجفاف	smelling flowers	أزهار فواحة
soggy soil	تربة رطب	invites	يدعو
wet	رطب	fluffy yellow	أصفر رقيق

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Exercises on Lesson (3)

1-Choose the correct answer?

1. Savannah is characterized by all the following except

a. grass land habitat b. it is rainy most of the year
c. it has a mild temperature. d. it has extreme lack of water.

2 It is difficult for rainforest plants to get

a. water b. wind c. sunlight d . oxygen

3. One of the behavioral adaptation of acacia tree is that …….

a. It has one very long root b.it has sharp spines among its leaves .
c. it has very tall trunk d. it producing poison to make a bad tasty leaves

4. Acacia tree trunk and camel hump.

a. both store water b. both store fat
c. the first stores fat , and the second stores water .
d. the first stores water , and the second stores fat .

5- All the following properties protect acacia leaves from being eaten by animals except

a. they are high enough . b. they are guarded by sharp spines .
c. they are brightly colored d. they produce a poison

6. The acacia tree warning the other nearby acacia trees from animals by sending

a. watery message in the air . b a watery message in the water
c. a smelly message in the air d . a smelly message in the water .

7. When the nearby acacia trees receive the smelly message from the acacia tree , which exposed to be eaten by animals , they

a. lose water from their trunks. b. invite bats to eat their leaves
c. make a poisonous substance in their leaves d. fall down their leaves

8. From Umbrella - shaped tree are .

a. mangrove tree and acacia tree . b. mangrove tree and kapok tree .
c . acacia tree and kapok tree . d . Barbary and water lilies .

9 . The roots of kapok tree are not planted deeply in the soil , because

a. the soil contains less water . b . the soil contains more water .
c . the climate is very cold . d . the climate is very hot .

10. Kapok tree use the wind to carry its fluffy yellow seeds across its

a. desert habitat . b . snowy habitat .
c. salt water habitat . d . rainforest habitat .

11. If a plant grows in a dry desert , it needs…….. to adapt for getting water .

a . long branches b . long leaves c. long roots d . more sunlight

12. If a plant grows in a rainforest , where it is hard to reach sunlight . So , it needs ……..to adapt for getting more sunlight .

a small roots b. a very tall trunk c. sharp spines d. a very short trunk

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13. If a plant grows in a snow habitat . So , it needs all the following characteristics except…….. to adapt this habitat .

a . short branches b . triangular shape c. needle leaves d . wide leaves

14. All the following are adaptation of different plants to keep animals away from them except that they

a . produce poison . b . gather their branches high above .

c . have delicious - smelling flowers . d . have sharp spines .

15. Desert plants are characterized by all the following except that they

a. store water b. have wide leaves c . have long roots d. have sharp spines

16. Palm tree has a tiny leaves like

a. pine tree b . kapok tree c. acacia tree . d . water lily plant

17. One From the structural adaptation of water lily plant is that .....

a. it has long root b.it has sharp spines d. it has wide leaves c. it has tiny leaves

18-Mangrove tree has long and strong roots to…

a. Resist the strong wind b. Resist the water waves

c. Prevent the loss of water d. absorb the underground water

19. This structural adaptation makes this tree face cold climate like the feet of

a caracal b . penguin c. fennec fox d . brown bear

20. Barbary fig keeps animals away like acacia trees by its

a. sharp spines b. poison c. smell . d. long leaves

2 Choose from column (B) what suits it in column (A)

(A)	(B)
1. Long and strong roots	a . prevent animals from eating barbary fig .
2. Wide leaves	b . make mangrove tree resists the water waves
3. Needle shaped leaves	c . allow the kapok tree's fluffy yellow seeds across the forest
4. Sharp spines	d . allow wind to move more gently through the leaves of kapok tree
5. Hand-shaped leaves	e . allow water lilies absorb large amount of sunlight
	f . prevent dosage of water in pine tree

1 .. ……. 2 . ……. 3……... 4. ……. 5. …….

3. Put (✓) or (x) :

7-Plants have structural adaptation only to help them survive and grow in different environments ( )

The rain falls for 6 months in Southern African Savannah ( )

3. The taproot of acacia tree grows deeply downward searching for water ( )

4. Acacia leaves are protected from eaten by animals as they have brightly colored leaves . ( )

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5. Acacia tree has long roots to hold it securely in the soil . ( )
6. Acacia tree and kapok tree used wind to send messages. ( )
7. Hand - shaped leaves of Kapok tree is considered as a behavioral adaptation ( )
8. The transfers of kapok tree's fluffy yellow seeds by wind across the rainforest is considered as a behavioral adaptation ( )
9. One from the structural adaptation of acacia tree is that it has a large, wide roots called buttress roots ( )
10. Mangrove trees adapt to resist the water waves through their tong, strong leaves( )1. Water lily has wide leaves to absorb a large amount of sunlight ( )
12 Pine trees live in desert habitat, adapt by having needle leaves to prevent losing of water ( )
13.Having thick roots are behavioral adaptation of palm trees to resist strong winds ( )
14 Animals can't eat Barbary fig due to its sharp spines. ( )
15. Plants of dry desert habitat adapt to store water. ( )
16. Some plant have sharp spines to absorb a large amount of sunlight ( )

4 Write the scientific term of each of the following : -

1. A tree that grows in Southern African Savannah and it has sharp spines around its leaves ( )
2. A structural adaptation of acacia tree that allows it to search for water (
3-A structural adaptation that surrounds the leaves of acacia tree to prevent animals from .eating them ( )
4-A tree that grows in Amazon rainforest of Brazil and it has hand-shaped leaves
5-A structural adaptation that fixes the kapok tree in soggy soil and support its trunk ( )
6-The part of the kapok tree which is supported by the buttress roots ( )
7. A tree lives in salt water habitat and has long, strong roots to resist the water waves ( )
8-A plant lives in wetland habitat and it has wide leaves to absorb a large amount of sunlight ( )
9-A structural adaptation in water lilies that helps them absorb a large amount of sunlight ( )
10-A structural adaptation that prevents the loss of water in the pine tree ( )

6. Give reasons for :

1. Branches of acacia tree are gather on the top of its trunk .

……

2. Acacia tree have sharp spines .

……

3. Wind is important to acacia trees .

……

4. Kapok tree has hand - shaped leaves .,.

……

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5. Kapok trees stay firmly rooted in the soggy soil although they are very tall .

……

6. Pine tree have a triangular shape . •

……

7. Although snow falls in large quantities on the pine tree , its branches do not break easily .

……

8. Water lilies can absorb large amount of sunlight

……

9-Palm trees have thick roots and small leaves

……

10-Barbary fig has sharp spines.

……

7-What happens if ... ?

1. The length of acacia taproot doesn't exceed 3 meters downward .

……

2. The acacia leaves are not guarded by sharp spines

……

3. There are no buttress roots in the kapok tree ,

……

4. The pine tree had an umbrella shape not a triangle shape .

……

5. Some plants of rainforest habitat became very short .

……

6-Water lily has narrow leaves instead of wide leaves .

……

7-Palm tree has thin roots and large leaves. .

……

8 Cross out the odd word :

1. Taproot - Tiny leaves - Savannah - Buttress roots - Producing a poison .

……

2. Rainforest - Taproot - Hand - shaped leaves - Soggy soil - Buttress roots .

……

3. Cactus plant - Barbary fig - Palm tree - Mangrove tree .

……

4. Acacia tree - Polar bear - Penguin - Pine tree

……

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lesson (4) The digestive system

الجهاز الهضمي

Look at the following figures, then complete the sentences below:

Figure (1)

Figure (2)

Figure (3)

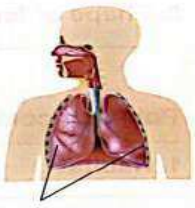


Figure (4)

1. Figure……..represents the human digestive system.
2. Figure……..represents the human respiratory system .

System: It is a group of organs that work together to do a specific function

الجهاز: هو مجموعة من الأعضاء التي تعمل معًا للقيام بوظيفة محددة

Digestive system: It breaks down food into small parts to enable the body cells to use them in getting energy.

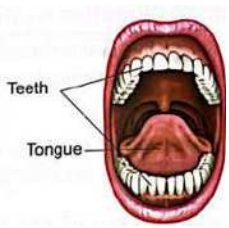
الجهاز الهضمي: يقسم الطعام إلى أجزاء صغيرة لتمكين خلايا الجسم من استخدامها في الحصول على الطاقة.

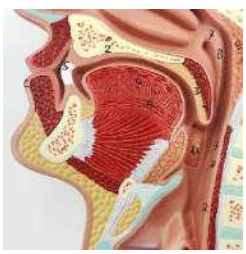
Digestion process: It is the process of breaking down food and the body absorbs and uses them in getting energy and growth.

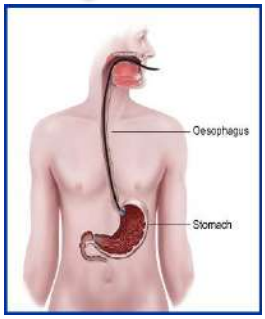
عملية الهضم: هى عملية تكسير الطعام الجسم ويستخدمها فى الحصول على الطاقة والنمو

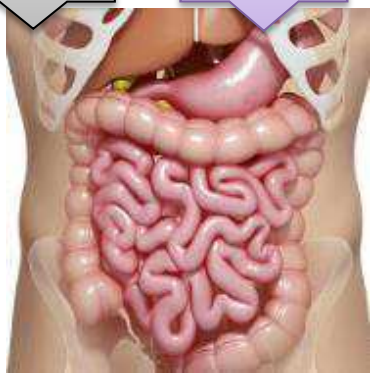
Human Digestive system الجهاز الهضمى للإنسان

Mouth الفم → Pharynx البلعوم → Esophagus المرئ → Stomach المعدة → Small intestine امعاء دقيقة → Large intestine امعاء غليظة









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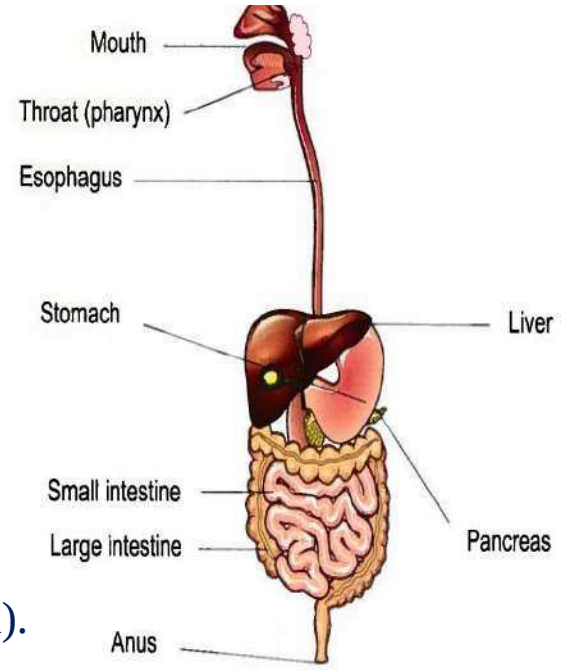
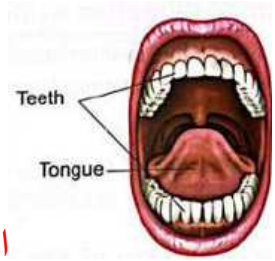
Human Digestive system



Digestive system begins in the mouth end at anus



1) The mouth الفـم

Digestion begins in the mouth.الفم: - يبدأ الهضم في الفم

Mouth contains:

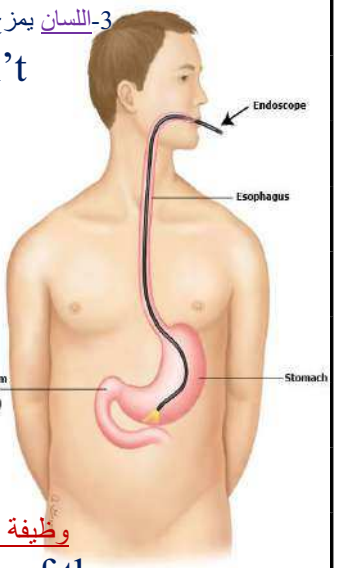
1. Teeth. They crush food chewing.
الأسنان ويسحقون الطعام المضغ

2. Saliva (it is a liquid substance in the mouth).
اللعاب (وهو مادة سائلة في الفم).

- It moisten and break down of food. وظيفة اللعاب: - يعمل على ترطيب الطعام وتفتيته. .

3. Tongue. It mixes food with saliva in the mouthاللسان يمزج الطعام مع اللعاب في الفم-3

What happen when organ of digestive system not found (can't do its function)



2-Esophagus • a long muscular tube..

• It allow food to moves from throat down into the stomach.
المريء • أنبوب عضلي طويل- يسمح للطعام بالانتقال من الحلق إلى المعدة •.

3) The stomach المعـــدة It is a muscular organ وهي عضو عضلي .

- Function of stomach: it mixes food with the stomach acid and digestive juices (enzymes) found in it to change the food into a soupy liquid.
وظيفة المعدة: فهي تمزج الطعام مع حامض المعدة .(الإنزيمات) الموجودة فيه لتحويل الطعام إلى سائل شوربة

• Food stays in the stomach for a few hours, then the muscles of the stomach move the food into a long, winding tube called small intestine.
يبقى الطعام في المعدة لبضع ساعات، ثم تقوم عضلات المعدة بنقل الطعام إلى أنبوب طويل متعرج يسمى الأمعاء الدقيقة.

4) The small intestine الأمعاء الدقيقة:-

• It is a long, winding tube as its length is more than 6 meters.

• Food is broken down into simple nutrients in the small intestine,:
•هو أنبوب طويل متعرج حيث يزيد طوله عن ستة أمتار يتفكك الطعام إلى مغذيات بسيطة في الأمعاء الدقيقة

- Pancreas and liver secrete juices to the small intestine.
- These juices help in breaking down the food into nutrients

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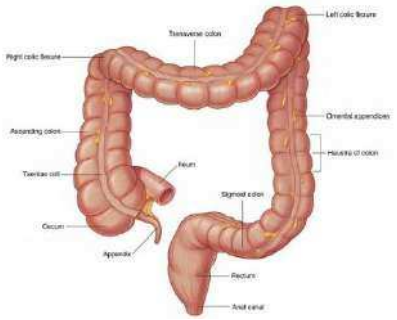
يفرز البنكرياس والكبد عصارة تتدفق إلى الأمعاء الدقيقة -تساعد هذه العصائر في تكسير الطعام إلى مغذيات (أو طعام مهضوم)

- These nutrients are absorbed through the wall of the small intestine as enter into tiny blood vessels and reach the blood.
- The blood carries the nutrients to all parts of body.

يتم امتصاص هذه العناصر الغذائية من خلال جدار الأمعاء الدقيقة لأنها تدخل في الأوعية الدموية الدقيقة وتصل إلى الدم.
- الدم يحمل العناصر الغذائية إلى جميع أجزاء الجسم



5) Large intestine الأمعاء الغليظة

• It is a tube that starts from the end of the small intestine and ends with the anus.

- الأمعاء الغليظة هو أنبوب يبدأ من نهاية الأمعاء الدقيقة وينتهي بفتحة الشرج .

- Function of large intestine:

: It absorbs water from the undigested materials, they become solid wastes that come out through the anus.

وظيفة الأمعاء الغليظة - يمتص الماء من المواد غير المهضومة فتصبح فضلات صلبة تخرج من فتحة الشرج

Comparison between the functions of the stomach, small intestine and large intestine

The stomach	The small intestine	The large intestine
Mixing food with the acid and digestive juices to change it into a soupy liquid	Breaking down of food into nutrients by the help of the juices of liver and pancreas	Absorbing the water from undigested materials

Keeping the Digestive System Healthy 1- Chew the food well 2- Don't eat much fast meals 3- Drink a lot amount of water

الحفاظ على الجهاز الهضمي صحي (سليم) 1- مضغ الطعام جيدا. 2- لا تأكل الكثير من الوجبات السريعة3- اشرب كمية كبيرة من الماء

The human respiratory system الجهـــــــاز التنفســـــى في الانسان

Respiration التنفـــــس

During sitting, Your breath slows down أثناء الجلوس ، التنفس تبطئ

During running Your breath increase أثناء الجري التنفس يزداد

Any living organism respires to get oxygen gas which is necessary to burn the digested food to get the needed energy for all the body activities,

يتنفس أي كائن حي للحصول على غاز الأكسجين الضروري لحرق الطعام المهضوم للحصول على الطاقة اللازمة

- The respiratory system is the system responsible for breathing (respiration)

(الجهاز التنفسي هو الجهاز المسؤول عن التنفس (التنفس -لجميع أنشطة الجسم ،.

* Respiration process is a process of entering the air carrying oxygen into the body and pushing the air carrying carbon dioxide out of the body.

* عملية التنفس هي عملية دخول الهواء الذي يحمل الأكسجين إلى الجسم ودفع الهواء الذي يحمل ثاني أكسيد الكربون إلى خارج الجسم

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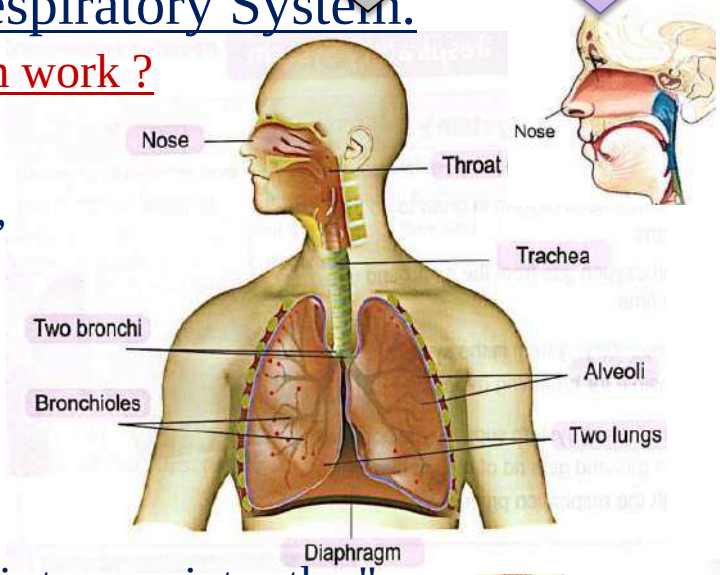
Human Respiratory system الجهاز التنفسى للإنسان

The nose الانف
Pharynx البلعوم
Trachea القصبة الهوائية
two bronchi الشعبتان
two lungs الرئتان
Diaphragm الحجاب الحاجز

Structure of Respiratory System.



How does the respiratory system work ?

كيف يعمل الجهاز التنفسى

Nose and mouth

During breathing in (inhalation), air enters through the nose and mouth then down the throat.

أثناء التنفس (الشهيق) ، يدخل الهواء عبر الأنف والفم ثم إلى أسفل الحلق

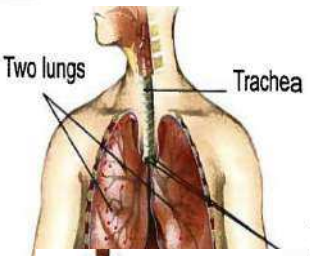
Throat allows the air to pass from nose to the trachea

الحلق يسمح للهواء بالمرور من الأنف إلى القصبة الهوائية

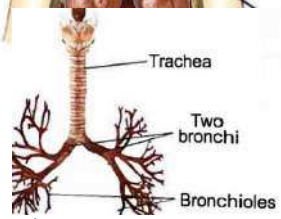
Trachea : - It is a tube that allows air to pass into the " two lungs " which fill up with air like two balloons .

- Inside the lungs , the trachea is branched into two tubes known as " two bronchi "

القصبة الهوائية: - هو أنبوب يسمح للهواء بالمرور إلى "الرئتين" اللتين تمتلئان بالهواء مثل بالونين
داخل الرئتين ، تتفرع القصبة الهوائية إلى أنبوبين يعرفان باسم " شعبتين "



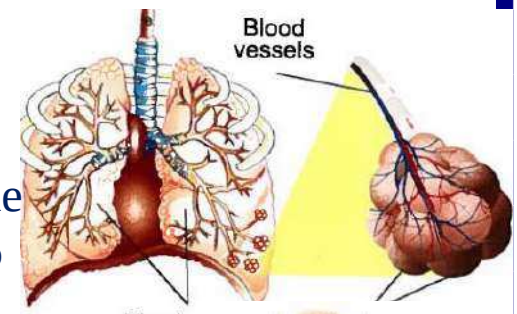
Two bronchi : - They allow the air to enter the two lungs . - They are divided into smaller and smaller tubes that look like the branches of a tree known as " bronchioles " .



قصبتان: - تسمحان بدخول الهواء إلى الرئتين- وهي مقسمة إلى أنابيب أصغر وأصغر تشبه أغصان الشجرة المعروفة باسم "القصيبات

Two lungs - Inside the lungs , the bronchioles end with little air sacs , surrounded by blood vessels known as " alveoli " .

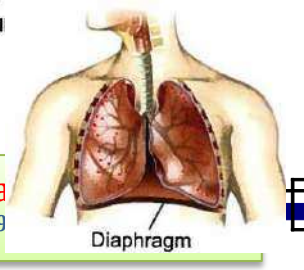
رئتان - داخل الرئتين ، تنتهي القصيبات بأكياس هوائية صغيرة ، محاطة بأوعية دموية تعرف باسم "الحويصلات الهوائية".



- Inside the blood vessels , oxygen moves into the blood which carries oxygen around the body to help other organs and system to work

داخل الأوعية الدموية ، ينتقل الأكسجين إلى الدم الذي يحمل الأكسجين في جميع أنحاء الجسم لمساعدة الأعضاء الأخرى والجهاز على العمل

Diaphragm : - It is a large muscle at the base of ribs which plays an important role in inhalation and exhalation.



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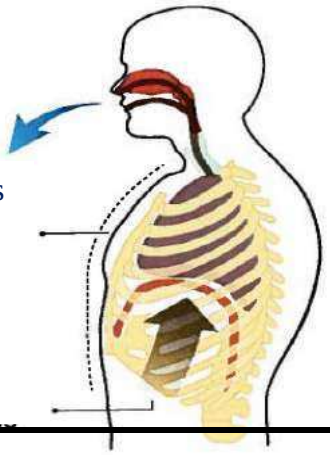
الحجاب الحاجز: - هو عضلة كبيرة في قاعدة الضلوع تلعب دورًا مهمًا في الشهيق والزفير.

How does the respiration process take place

Respiration process includes Inhalation (breathe in) Exhalation (breathe out)

كيف تتم عملية التنفس تشمل عملية التنفس 1- الاستنشاق (الشهيق) -2-الزفير (الزفير)

Inhalation الشهيق	Exhalation الزفير
Size of chest increases (enlarges) Diaphragm contracts 	Size of chest decreases (become narrow) Diaphragm relax 
Diaphragm muscle	
The diaphragm contracts (shrinks) and moves downward	The diaphragm relaxes (expands) and moves upward
Size of chest	
size of chest increases(enlarges)	size of chest decreases (narrow)
Type of air	
The air rich in oxygen gas enters the lungs	The air rich in carbon dioxide gas expelled out of the lungs

Explain ? How does the respiratory system get oxygen to the body cells?

اشرح ؟ كيف يصل الجهاز التنفسي بالأكسجين إلى خلايا الجسم؟

Oxygen enters the lungs during inhalation, then the blood transfers oxygen to an the body cells. يدخل الأكسجين إلى الرئتين أثناء الاستنشاق ، ثم ينقل الدم الأكسجين إلى خلايا الجسم

G.R. We can't hold our breath for a very long time ?

لا يمكننا حبس أنفاسنا لفترة طويلة جدا؟

Because we can't inhale oxygen and expel out carbon dioxide so , the body can't perform its vital processes .

لأننا لا نستطيع استنشاق الأكسجين وطرد ثاني أكسيد الكربون ، لذلك لا يستطيع الجسم أداء عملياته الحيوية.

How can you keep the respiratory system healthy ?

1 Breathing clean air 2 Avoid smoking and smoking areas

3. Eat fruits rich in vitamin (C) such as orange and guava .

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Digestive system	الجهاز الهضمى	Inhalation	الشهيق
Pharynx	البلعوم	Exhalation	الزفير
Esophagus	المرئ	Pancreas	البنكرياس
Mouth	الفم	liver	الكبد
Stomach	المعدة	simple nutrients	مغذيات بسيطة
Small intestine	امعاء دقيقة	air sac "alveoli "	الحويصلات الهوائية
Large intestine	امعاء غليظة	enzymes	الإنزيمات
Respiratory system	الجهاز التنفسى	digestive juices	عصير الهضم
The nose	الانف	throat	الحلق
Trachea	القصبة الهوائية	chewing	يمضغ
two bronchi	الشعبتان	crush	يسحق
two lungs	الرئتان	Teeth	الأسنان
Diaphragm	الحجاب الحاجز	Saliva	اللعاب

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Exercises on Lesson (4)

1-Choose the correct answer?

1. The energy needed to perform different functions of a living organism obtained from…….. .
a . breathing only b . food processing only .
c . breathing and running . d . breathing and food processing .

2. All the following are organs in the digestive system except ……
a . mouth . b . nose . c . stomach . d . esophagus

3. The stomach lies between esophagus and ……..
a . mouth . b . large intestine . c . small intestine d . anus .

4. Which of the following organs is not included in breaking down of food ?.....
a . Mouth b . Stomach c . Lungs d . Small intestine . .

5. Crushing the food in your mouth is a function of .....
a . stomach . b . tongue . c . saliva d . teeth

6. All the following are correct about the mouth except
a . it is the first organ in the digestive system b . it has teeth .
c. it has tongue d . it moves food to the stomach directly .

7. Saliva in the mouth makes the food becomes soft and mushy with the help
a. teeth only b . tongue only c . teeth and esophagus .. d . teeth and tongue

8. The throat is connected to the stomach through
a. esophagus b . trachea . c . small intestine . d . large intestine

9. The organ that moves the food into the stomach is
a . mouth b . tongue c . esophagus d . small intestine

10. The food passes from the stomach to……..directly
a . esophagus b . small intestine c . large intestine d . anus

11. The stomach mixes the food with .....
a . digestive juices only . b . stomach acid only
c . saliva and digestive juices d . stomach acid and digestive juices .

12. The liver and ..... pour their juices into the small intestine .
a . throat b . esophagus c . large intestine d . pancreas

13. The long winding tube its length is about more than six meters is called
a . large intestine b . small intestine c . esophagus d . stomach .

14. The undigested materials of the food pass from the small intestine into
a . the liver b . the pancreas c . the brain d . the large intestine

15. In the large intestine……. is absorbed from the undigested food .
a . starch b . fats c. water d . oil.

16. The solid wastes of undigested food become useless to the body , so the body must expel it outside the body through the .....
a . mouth b . anus c . large intestine d .. small intestine

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17-All organs of the human digestive system are considered as adaptation

a only structural b. only behavioral

c structural and behavioral d. neither structural nor behavioral

18-During inhalation, air enters through ……then down the throat

a. nose and trachea b. nose and mouth c. mouth and lungs d. mouth and trachea

19 . The passage of air during inhalation is…….

a. throat - nose - lungs - trachea b . trachea - throat - lungs - nose .

c . lungs - nose - throat – trachea d . nose - throat - trachea - lungs .

20 . The throat is connected to the lungs through

a . esophagus . b . trachea . c . small intestine d . ribs .

21 . Inside the two lungs , at the end of the smaller air passages (bronchioles) there are tiny air sacs surrounded by…….

a . air . b . water . c. Small intestine d . blood vessels

22. Inside the two lungs the trachea is branched into two tubes known as…..

a . Alveoli . b , air sacs . c . bronchi . d . blood vessels

23-The oxygen gas moves from air into blood at the

a. nose b. throat c. trachea d. lungs

24-All of the following happen during exhalation, except

a. diaphragm relaxes. b. diaphragm contracts

c. diaphragm moves upward d. the size of chest decreases.

2 Choose from column (B) what suits it in column (A)

1- (A)	(B)
1. Esophagus	a . absorbs water from the undigested food to become solid waste
2. small intestine	b . mixes the food with an acid and digestive juices.
3. Large intestine	c . the digestion begins in it
4. Stomach	d . food gets completely digested in it
5. Mouth	e . is a tube has muscles that move the food down into the stomach .
	... f . solid waste leaves the body through it

1 .. ……. 2 . ……. 3……... 4. …… 5. …….

2- (A)	(B)
1. Trachea	a . is a large muscle at the base of the ribs that help in process of exhaling and inhaling
2. Blood	. b . are like balloons and they contain little sacs surrounded by blood vessels
3. Diaphragm	c . carrying the oxygen to all body organs
4. Lungs	d . is a tube through it which air travel down into the lungs
	e . air enters the body through them

1 .. ……. 2 . ……. 3……... 4. ……

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3. Put (✓) or (x) :

1. The digestive system consists of similar organs that work together to get nutrients from food . ( )
2. The human body gets oxygen gas from food . ( )
3. Mouth , nose , esophagus and the stomach are from the organs of the digestive system . ( )
4. The food passes through the large intestine before it goes into the small intestine ( )
5. Digestion process begins in stomach with the help of saliva . ( ).
6. Tongue and teeth moisten the food , while saliva crushes the food until it becomes soft . ( )
7. Food passes from mouth to stomach through a narrow tube known as small intestine . . ( )
8. Food usually stays in stomach for few hours until it becomes a soupy liquid ( )
9 . Stomach mixes the food with juices that come from liver and pancreas ( )
10. The food gets broken down into nutrients in the small intestine . ( )
11.The walls of the small intestine absorb the nutrients through tiny blood vessels then blood carries them to all the body parts. ( )
12. Swallowing food without chewing keeps the digestive system healthy . ( )
13 . Digestive system ends by anus . ( )
15. During inhalation, the size of chest becomes narrow ( )
16. During exhalation, the diaphragm expands . ( )
17 . The inhaled air is rich in carbon dioxide gas , while the exhaled air Evaluate is rich in oxygen gas ( )
21. Exposing to air rich in dust harms the respiratory system . ( )

4 Write the scientific term of each of the following : •

A system that helps in breaking down food into smaller parts. (…….)
2. A group of organs that work together to perform a specific job (…….)
3. A process of breaking down food into smaller parts that the body cells absorb and use to get energy and growth (…….)
4.The organ, where the digestion process begins (…….) .
5. They present in the mouth and play an important role in crushing of food (…….)
6. A liquid substance in your mouth that moistens the bite of food and begins to break it down (…….)
7. The organ which receives the food from esophagus (…….)
8.An organ that has tiny blood vessels to absorb the nutrients through its walls (…….)
9. An organ through which solid wastes of digestion leave the body (…….)
10. A long muscular tube that moves the food down into the stomach(…….)

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11.A process of pulling air in and pushing air out of the body, (…….) .
12. Little air sacs surrounded by blood vessels in the respiratory system (…….)
13.A large muscle that contracts during breathing in and relaxes during breathing out .
(…….)

6- Give reasons for :

1. The human body is made up of different systems ..
……
2.The importance of juices of liver and pancreas .
……
3.Anus is an important organ in the digestive system .
……
4.The inhaled air differs from the exhaled air
……
5.Diaphragm plays an important role in respiration process .
……

7-What happens if ... ?

1. The small intestine is removed from the human body .
……
2. The nutrients absorbed by the wall of small intestine enters the tiny blood vessels ……
3. The diaphragm moves downward during inhalation .
……
4. The diaphragm moves upward during exhalation
……

8 Cross out the odd word : ..

1. Saliva - Stomach - Esophagus - Small intestine .
2. Mouth - Lungs - Stomach - Large intestine .
3. Nose Throat - Trachea - Anus .

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lesson (5) Respiration in fish

Respiration in fish التنفس في السمكه

. Can you stay and breathe under water all the time?

Yes ☐ No ☐

Can fish stay and breathe under water all the time ?

Yes ☐ No ☐

• **Structural adaptation of fish:** التكيف التركيبي للأسماك

- Unlike human, fish don't breathe using lungs, but they have gills to breathe.

على عكس الإنسان، لا تتنفس الأسماك باستخدام الرئتين، ولكن لديها خياشيم للتنفس

- Gills are considered as unique structural adaptation that allow fish to live and breathe under water

- تعتبر الخياشيم تكيفًا بنيويًا فريدًا يسمح للأسماك بالعيش والتنفس تحت الماء.

Gills are found on both sides of a fish's head

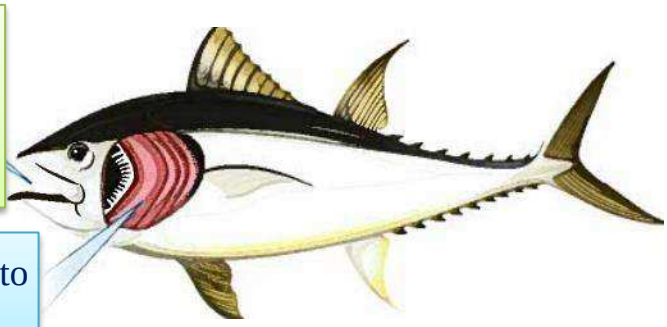
- توجد الخياشيم على جانبي رأس السمكة..

How do fish breathe under water?

كيف تتنفس الأسماك تحت الماء؟

Water enters the mouth of the fish and passes across the gills that extract oxygen gas from water.

يدخل الماء إلى فم السمكة ويمر عبر الخياشيم التي تستخرج غاز الأكسجين من الماء



Blood vessels inside the gills carry oxygen gas to rest of the body and release carbon dioxide gas.

الأوعية الدموية داخل الخياشيم تحمل غاز الأكسجين إلى باقي أجزاء الجسم وتطلق غاز ثاني أكسيد الكربون.

Note **Fish need clean water to survive** ملحوظة: تحتاج الأسماك إلى مياه نظيفة للبقاء على قيد الحياة

we need to breathe clean air to stay Healthy كما نحتاج إلى تنفس هواء نظيف للبقاء بصحة جيدة

P.O.C	The humans respiratory system	The Fish respiratory system
similarities	both of Fish and Man take oxygen in inhalation and get out carbon dioxide in Exhalation and distribute oxygen on all body part	
differences	Man has lungs to get oxygen from air	Fish has gills to get oxygen from water

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Activity (11)

Humans change the environment

البشر يغير البيئه

Human activities cause changes or impacts in the ecosystem over time, so organisms will have to adapt these changes to survive.

تتسبب الأنشطة البشرية في حدوث تغييرات أو تأثيرات في النظام البيئي بمرور الوقت، لذا يتعين على الكائنات الحية التكيف مع هذه التغييرات من أجل البقاء.

Human activities that cause changes in the environment:

الأنشطة البشرية التي تسبب تغييرات في البيئة:

1- Cutting down forests قطع الغابات

2- Farming and clearing lands زراعة وتطهير الأراضي

3- Building communities instead of grasslands بناء مجتمعات بدلا من المراعي

4- Introducing plants and animals into the environment

إدخال النباتات والحيوانات إلى البيئة

5-Air pollution from cars and some factories تلوث الهواء من السيارات و المصانع

6-Water pollution from throwing waste materials to water and soil

تلوث المياه من إلقاء النفايات في الماء والتربة

Note Changes resulted from human activities can cause the disappearance of plants and animals that once lived in an environment

ملاحظة التغييرات الناتجة عن الأنشطة البشرية يمكن أن تتسبب في اختفاء النباتات والحيوانات التي كانت تعيش في بيئة ما

Give reason Although the air , water and soil get polluted as a result of human a plants and animals can survive ..

على الرغم من تلوث الهواء والماء والتربة نتيجة للإنسان ، يمكن للنباتات والحيوانات البقاء على قيد الحياة ... .

Because - Some animals can survive by moving to another ecosystem to find what they need.

يمكن لبعض الحيوانات البقاء على قيد الحياة بالانتقال إلى نظام بيئي آخر للعثور على ما تحتاجه

- Plants depend on their seeds to land in a better place for them to survive and grow

تعتمد النباتات على بذورها للهبوط في مكان أفضل لها للبقاء والنمو -

* As the human activities have negative effects on animals and plants, they also have negative effects on human such as:

كما أن للأنشطة البشرية آثار سلبية على الحيوانات والنباتات، فإنها لها أيضًا آثار سلبية على الإنسان مثل:

1-Damage of lungs تلف الرئتين 2- Heart diseases أمراض القلب

3- Asthma (breathing difficulty). الربو (صعوبة التنفس) .

Notes

1. Water pollution makes the human hard to find clean drinking water.
2. Air, water and soil pollution make the crops cannot grow.
3. Air pollution (smog) makes the human hard to breathe.
4. People live in cities that have high air pollution level must change their lifestyle to decrease air pollution.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
under	تحت	release.	تطلق
considered	تعتبر	carbon dioxide gas	غاز ثاني أكسيد الكربون
unique	فريدًا	Asthma	الربو
gills	خياشيم	breathing difficulty	صعوبة التنفس
Unlike	على عكس	Damage of lungs	تلف الرئتين
breathe	تتنفس	Heart diseases	أمراض القلب
extract	تستخرج	human activities	للأنشطة البشرية
oxygen gas	غاز الأكسجين	negative effects	آثار سلبية
clean water	مياه نظيفة	clean air	هواء نظيف
Healthy	بصحة جيدة	survive	للبقاء على قيد الحياة

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Exercises on Lesson (5)

1-Choose the correct answer?

1. Both of human and fish
a. can breathe in air. b. can breathe in water.
d. use oxygen gas to breathe in. d. use carbon dioxide gas to breathe in.

2. Fish use……. to breathe in water
a. tail b. eyes c. lungs d. gills

3. Gills differ from lungs, in that gills.
a. take in oxygen gas. b. expel out carbon dioxide gas. .
c. extract oxygen gas from water. d. extract oxygen gas from air.

4. Gills in fish are considered as ……..
a. behavioral adaptation. b. structural adaptation.
c. camouflage adaptation. d. behavioral and structural adaptation

5. Changes that occur slowly to the environment,
a. cause many organisms to die b. cause many organisms to respire
c. cause many organisms to disappear.
d. give a chance to the organisms for adaptation.

6-All of the following human activities can negatively affect the nature except
a. cutting down forests b. removing air pollutants
c. farming and clearing lands. d. throwing wastes in waterways

7. Human activities and bad habits, can pollute…... of an ecosystem.
a. air and soil only. b. soil and waterways only
c. air and waterways only d. air, soil and waterways

8. Pollution of an ecosystem, can affect .
a. plants and animals only. b. animals and humans only.
c. humans and plants only. d. plants, animals and humans.

9. If the environment is slowly changed, plants ……to survive and grow.
a. must have a taproot b. must have buttress roots
c. must decrease their adaptation d. must land their seeds in another better place

10-From the negative effects of human activities on the human health are
a lung damage and asthma b. asthma and wounds
c. heart problems and wounds d. lung damage and wounds

11.Human can help restoring ecosystem by all of the following except
a replanting the cleared forests b. removing air and water pollutants
c. producing more factories exhausts d. preserving existed plants and animals

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3- Put (√) or (X):

1. Human breathes using gills, while fish breathes using lungs. ( )
2. Gills are found on one side of a fish's head. ( )
3. Both of lungs and gills take carbon dioxide gas inside the body and release oxygen gas outside the body ( )
4. Gills are unique physical adaptation that allow fish to live and breathe under water( ),
5. As human needs clean water to drink, fish needs clean air to breathe. ( )
6. Organisms have no chance to adapt, if the environmental changes are rapidly ( )
7. When an ecosystem is slowly changed, many organisms may die or even become extincted. ( )
8. Cutting down rainforests, may causes disappearance of starred agama. ( )
9. Wildfires and floods are natural changes that may occur to an ecosystem ( )
10. Throwing waste materials in waterways is one of the bad habits, that must be stopped. ( )
11. The way of survival of animals differ from that of plants, if the ecosystem is rapidly changed. ( )
12. Pollution is one of the most dangerous problems, that affect all living organisms. ( )
13. Respiratory problems like lung damage and asthma, occur when water pollution is high over a long period of time. ( )
14. Humans can restore ecosystem as well as they can harm it. ( )
15. When the pollution level in a city is very high, people are forced to change their lifestyle. ( )

4 Correct the underlined words :

1. Fish use gills to take <u>carbon dioxide gas</u> out of the water, (……)
2. <u>Air</u> enters the mouth of a fish and then passes across the gills. (……)
3. Blood vessels of lungs and gills are similar in carrying <u>carbon dioxide gas</u> to all the parts of the body. (……)
4. Gills are unique <u>behavioral adaptations</u> that allow fish to breathe under water (……)
5. If an ecosystem is <u>slowly</u> changed, living organisms may have no chance to survive. (……)
6. <u>Cutting down forests</u> is one of the natural changes, that cause severe damage to the agricultural fields. (……)
7. When an ecosystem is severely polluted, <u>animals only</u> are affected. (……)
8. <u>Water pollution</u> is caused due to the smog of factories and cars (……)

5-Write the scientific term of each of the following

1 . structure that allows fish to breathe under water . (……)
2. A gas that present in air and water , and is very important for breathing process . (……)

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3. A gas which the human and fish bodies must get rid of during exhalation process. (……)

4.A kind of pollution that is caused due to throwing waste materials into the .waterways and soil (……)

5.A kind of pollution that is caused due to the exhausts from cars and some factories (……)

7- Give reasons for :

1. Gills is a unique structural adaptations in fish .

……

2. Changes that occur rapidly to the ecosystem is more dangerous for the living organisms , than slow changes .

……

3. Cars and factories exhaust cause breathing problems .

……

4. Sometimes people in big cities are forced to change their lifestyle .

……

8 What happens if ... ?

1. The ecosystem is slowly changed . (according to survival of the living organisms

……

2. The ecosystem is rapidly changed . (according to survival of the living organisms

……

3. Human activities and bad habits increases .

……

4. The exhaust from Cars and factories increases in big cities .

……

5.Water pollution increase (for human and fish)

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lesson (6) Careers and adaptation

الوظائف و التكيف

The relation between functions and adaptation

العلاقة بين الوظائف و التكيف

Careers and adaptation : الوظائف و التكيف

In amphibians which are one of the most amazing living organisms on Earth .

في البرمائيات التي تعد واحدة من أكثر الكائنات الحية المدهشة على وجه الأرض . .المهددة بالانقراض على البقاء

Amphibians :

They are small animals that live on land and in water such as :

Frogs

Toads

Salamanders

• They can live in moist (wet) environments like rainforests , water streams and ponds .

• يمكنهم العيش في بيئات رطبة (رطبة) مثل الغابات المطيرة وتيارات المياه والبرك .

• Adult amphibians, can breathe using lungs when they are on land , but amphibians can also take in oxygen from water .

• مثل البشر ، يمكن للبرمائيات البالغة أن تتنفس باستخدام الرئتين عندما تكون على الأرض ، ولكن يمكن للبرمائيات أيضًا أن تأخذ الأكسجين من الماء .

Structural adaptation of amphibians to live in wet environments :

• Amphibians breathe (respire) through their lungs and skin to adapt to live on land and in water as follows:

• تتنفس البرمائيات من خلال رئتيها وجلدها لتتكيف لتعيش على الأرض وفي الماء على النحو التالي:

Breathe in through lungs تنفس من خلال الرئتين	Breathe in through skin تنفس من خلال الجلد
On land , amphibians take oxygen gas from air through their lungs على اليابسة ، تتنفس البرمائيات غاز الأكسجين من الهواء عبر رئتيها	Their bodies are covered with skin - allows water and gases to pass so the can absorb (extract) oxygen direct from water أجسام البرمائيات مغطاة بجلد يسمح بمرور الماء والغازات لذلك يمكن امتصاص (استخراج) الأكسجين مباشرة من الماء

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Amphibians need clean water and air to stay healthy , because they are very sensitive to the effects of :

البرمائيات تحتاج إلى مياه نظيفة وهواء للبقاء بصحة جيدة ، لأنها حساسة جدًا لتأثيرات- :

1- Water pollution . 2- Air pollution

3-Viruses that can travel through water .

تلوث المياه - . تلوث الهواء -الفيروسات التي تنتقل عبر الماء.

The role of scientists to protect many types of amphibians from extinction

دور العلماء في حماية أنواع كثيرة من البرمائيات من الانقراض

Scientists (biologists) are working to save many types of amphibians from extinction by studying :

- How amphibians breathe in air and water .
- Factors cause air and water pollutions that affect the life of amphibians

What make these animals sick in their environments ..

▪يعمل العلماء (علماء الأحياء) على إنقاذ العديد من أنواع البرمائيات من الانقراض من خلال دراسة- :

كيف تتنفس البرمائيات فى الهواء والماء

عوامل تسبب تلوث الهواء والماء التي تؤثر على حياة البرمائيات- . ما الذي يجعل هذه الحيوانات مريضة في بيئتها..

How do people help in protection amphibians from extinction ?

• Clean air and water are important for amphibians , so people should - Avoid throwing waste materials in water

- Dispose of chemicals in a correct way helps to avoid water pollution .

• كيف يساعد الناس في حماية البرمائيات من الانقراض؟

الهواء النظيف والماء مهمان للبرمائيات ، لذلك يجب على الناس:

- تجنب رمي النفايات في الماء .التخلص من المواد الكيميائية بطريقة صحيحة يساعد على تجنب تلوث المياه.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Careers	المهن	Extinction	الانقراض
Dispose	التخلص من	Viruses	الفيروسات
Scientists	العلماء	sensitive	حساسة
biologists	علماء الأحياء	Avoid	تجنب
moist	رطبة	Salamander	السمندر
Environment	بيئة	Avoid	تجنب
amphibians	البرمائيات	throwing	رمي
amazing	الرائعة	waste	النفايات

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Exercises on Lesson (6)

1-Choose the correct answer?

1. Amphibians live in …… that suits its adaptation
a. dry environment b . moist environment
c . arctic environment. d . sandy environment

2. Starred agama and salamanders ,
a both are reptiles . b . both are amphibians .
c . the first is reptile , while the second is amphibian .
d . the first is amphibian , while the second is reptile .

3. If amphibians have gills not lungs and cannot respire through skin , then……..
a . they cannot live outside water b . they can live outside water .
c . they cannot live underwater d . they can live in desert landscape .

4. Amphibians can take in oxygen gas from …….
a . water only b . air only c . food and air d . water and air

5. In rainforests , we can find ……..
a . panther chameleon and arctic foxes b . amphibians and fennec foxes .
c . arctic foxes and fennec foxes d . panther chameleon and amphibians .

6. If the number of an animal species becomes zero due to severe changes in its natural habitat , this means that this species
a. becomes endangered b . becomes extinct .
C. will survive d . going to be extinct ..

7. Both humans and amphibians breathe in oxygen . Which of the following sentences is correct ?
a . Both can breathe oxygen gas through lungs .
b . Both can take in oxygen gas through skin .
c . Humans can breathe oxygen gas from water and air .
d . Amphibians can breathe oxygen gas in air and water

8. Blood vessels that carry oxygen gas in amphibians , present in
a . skin and digestive system . b . lungs and eyes .
c . digestive system and eyes . d . skin and lungs

9. Amphibians , lizards , trees , birds , fish and humans ……
a . some of them need oxygen gas to respire .
b . some of them need carbon dioxide gas to respire .
c . all of them need oxygen gas to respire .
d . all of them need carbon dioxide gas to respire .

10. If a pond where some frogs live , is highly polluted with wastes and viruses . What you have to do to preserve these frogs ?
a . Fill in pond with sand . b . Dry this pond from water .
c . Supply this pond with more oxygen gas .
d . Transfer these frogs to a clean water habitat .

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2- Put (√) or (X):

1. Amphibians includes frogs , starred agama and salamanders . ( )
2. The natural habitat of amphibians is rainfall forests , while that of panther chameleon is desert . ( )
3. The number of amphibians increases in the last few years , due to restoring of its ecosystem . ( )
4. Arctic foxes and amphibians cannot found in the same habitat . ( )
5. Salamanders and fish can breathe in air through lungs . ( )
6. In the habitat of amphibians , we can find some types of reptiles . ( )
7. Scientists try to save golden frogs , as they are going to be extinct animals ( )
8. Clean water and air are very important for digestion process in amphibians ( )
9. Its important to advice people to avoid throwing wastes in water ways to save amphibians ' life ( )

4- Write the scientific term of each of the following :

1. A species that includes frogs , toads and salamanders . ( )
2. The organ through which salamanders can take in oxygen gas directly from water ( )
3. A gas that is present in water and air, and supply amphibians with energy ( )
4. The type of adaptation that allows frog to take in oxygen gas from water directly through the skin. ( )
5. A respiratory organ that contains little sacs , and found in humans , frogs , cows but not in fish .. ( )

5- Complete the following sentences :

1. Starred agama lizard is a …….. while frog is an …….
2. Humans , amphibians and reptiles have . …….. to breath oxygen gas in air
3. Bull shark can respire through …….. only while salamander can respire through …….. and ……..
4. Both humans and adult amphibians have no…….. that present in fish for respiration
5. As the pollution rate of water in ponds and air increases , the number of amphibians……..
6-. Amphibians have two ways to breathe oxygen , one from air through …… and the other from water through…….
7. The ability of amphibians to take in oxygen gas from water through the skin , is considered as ……..adaptation .
8. All living organisms , breath oxygen gas and gives…….as waste product
9. Pollution of ……and …… may cause a big problem on the amphibians survival

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6 Correct the underlined words :

1. Fish can breath only in air . ( )
2. Amphibians live in dry environments . ( )
3. Starred agama is a reptile , while frog is a lizard ( )
4. Amphibians have gills as well as humans for respiration ( )
5. Amphibians can take in carbon dioxide from air for respiration ( )
6. In rainforests , we can find panther chameleon and arctic fox ( )
7. Reptiles have two different ways for breathing . ( )
8. Humans and frogs can breathe oxygen in water ( )

7. Give reasons for :

1. Skin of fish is different from that of frog , although both of them live in water .

.....

2. Dry seasons is very harmfull for amphibians .

.....

3. Pollution of air and water can affect the survival of amphibians .

.....

4. Scientists must study how amphibians interact with their environment .

.....

8 What happens if ... ?

1. Pollution level increases in the natural habitat of amphibians .

.....

2. The ecosystem of amphibians is containing clean air and water .

.....

3. Amphibians don't have lungs and breathe only through skin

.....

4-The number of predators of amphibians increases .

.....

.....

5. Salamanders have lungs only to respire .

.....

6. Skin of frogs becomes dry .

.....

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Concept 1.2 lesson (1)

Senses at work Can you Explain?

how these living organisms receive stimuli from their surrounding environments (such as, feeling hungry - thirsty - running away from enemies - cold... etc.) as well as how they are responding to them?

كيف تستقبل الكائنات الحية المذكورة أعلاه المنبهات من البيئات المحيطة بها (مثل الشعور بالجوع -العطش -الهروب من الأعداء -البرد ... إلخ) وكذلك كيفية استجابتها لها؟

- Humans can listen to music through the organ hearing, which is the ears
- Owls have extraordinary senses of hearing and sight to be able to find their prey in the dark.
- Dogs have very sharp senses of hearing and smell, therefore they are used in guarding.
- The Egyptian mongoose makes sounds that spread information to other mongooses to move from one place to another or when searching for food.

• الانسان يمكن الاستماع إلى الموسيقى من خلال جهاز السمع ، وهو الأذنين اليوم تتمتع بحواس غير عادية من السمع والبصر لتتمكن من العثور على فرائسها في الظلام
• الكلاب لها حاسة سمع ورائحة قوية جدا ، لذا فهي تستخدم في الحراسة .
• النمس المصري يصدر الأصوات التي تنشر المعلومات إلى النموس الأخرى للانتقال من مكان إلى آخر أو عند البحث عن الطعام.

From the previous explanation it is clear that :

Animals have senses like humans however, some animals have sharper sense of hearing or sight, or their strength lies in some other senses that enable them to communicate with each other using sounds or movements, so that they are able to adapt to their surrounding environments and can survive.

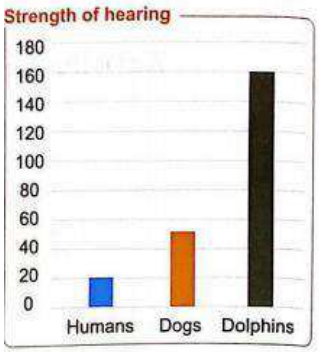
يتضح من الشرح السابق أن تمتلك الحيوانات حواسًا مثل البشر ، ومع ذلك ، فإن بعض الحيوانات لديها حاسة سمعية أو بصرية أكثر قوة ، أو تكمن قوتها في بعض الحواس الأخرى التي تمكنها من التواصل مع بعضها البعض باستخدام الأصوات أو الحركات ، بحيث تكون قادرة على التكيف مع بيئاتها المحيطة و يمكن البقاء على قيد الحياة.

Activity 2

Dolphin Super Senses دولفين حساس سوبر

- Hearing is one of the most important senses for all of us,
-Our sense of hearing allows us to gather information about the world around us.

- السمع من أهم الحواس بالنسبة لنا جميعاً ،
- حاسة السمع لدينا تسمح لنا بجمع معلومات حول العالم من حولنا.



Look at the opposite graph, and then answer the following the question:

انظر إلى الرسم البياني المقابل ، ثم أجب عن السؤال التالي:

Do the living organisms in the graph have similar hearing senses?

Yes ☐ No ☐

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Dolphins have super senses that help them survive through

1.Finding food. 2. protect themselves under water.

تتمتع الدلافين بأحاسيس خارقة تساعده لتعيش خلالا:.. • البحث عن الطعام. • حماية أنفسهم تحت الماء

The most sharp sense that dolphins have is the sense of hearing, since they can hear all sound tones.

إن أكثر الحواس قوة التي تمتلكها الدلافين هي حاسة السمع ، حيث يمكنها سماع جميع نغمات الصوت

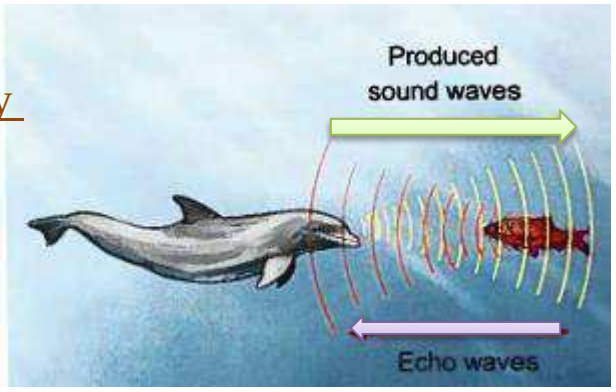
How can dolphins locate organisms and other things under water?

• Dolphins use a property known as "echolocation" that depends on "echo" to detect the location of other living organisms and objects in the water.

كيف يمكن للدلافين تحديد موقع الكائنات الحية والأشياء الأخرى تحت الماء؟ • تستخدم الدلافين خاصية تعرف باسم "تحديد الموقع بالصدى" والتي تعتمد على "الصدى" لاكتشاف موقع الكائنات الحية والأشياء الأخرى في الماء.

Echo: It is the reflection (bouncing off) of sound waves back from a. solid surface source

الصدى: هو انعكاس (ارتداد) الموجات الصوتية من مصدر سطح صلب



How dolphins use echolocation property

1. Sound produced by dolphins travels in the form of waves called sound waves.
2. These waves travel through water, and when they hit objects, they bounce dolphins in the form of echo.
3. Echo helps dolphins locate their preys.

كيف تستخدم الدلافين خاصية تحديد الموقع بالصدى 1. ينتقل الصوت الذي تنتجه الدلافين على شكل موجات تسمى الموجات الصوتية. 2. تنتقل هذه الموجات عبر الماء، وعندما تصطدم بالأجسام، ترتد الدلافين في شكل صدى. 3. يساعد الصدى الدلافين في تحديد موقع فرائسها.

Activity 4 What Do You Already Know About Senses at Work?

Animal		Sense	Purpose
Fox		Hearing - Sight	Avoiding danger
Chameleon		Sight - Taste	Searching for food
Dog		Smell – Sight	Recognizing friends
Monkey		Touch- Smell - Sight - Taste - Hearing	Identifying things

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Owls	البوم	Monkey	قرد
mongoose	النمس	Touch	اللمس
thirsty	العطش	Smell	الشم
hungry	الجوع	Hearing	السمع
Recognizing	التعرف على	Sight	البصر
Identifying	تحديد	Taste	التذوق
Echo	الصدى	locate	تحديد
reflection (bouncing off)	انعكاس (ارتداد)	waves	الموجات
sound waves	الموجات الصوتية	echolocation"	تحديد الموقع
Avoiding	تجنب	Searching	البحث
Dolphin	دولفين	Super Senses	حساس سوبر

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Concept (1.2)

Exercises on Lesson (1)

1-Choose the correct answer?

1. To know if a cup of water is hot or cold , we need to use the sense of
a . sight b . hearing c . smell d . touch .

2. We can distinguish between water and milk through
a . taste and hearing . b . sight and hearing .
c . smell and hearing . d . taste and sight

3. The sensory organs of a dolphin help it do all of the following , except …
a . surviving b . finding food .
c . finding water . d . protecting itself under water ..

4. If one of the dish contains sugar and the other contains salt , we can distinguish between them through the sense of
a . smell . b . taste . c . touch , d . hearing .

5. The five senses of humans include
a . sight , hearing , touch , smell , and movement .
b . sight , movement , taste , touch , and smell .
c . taste , touch , movement , hearing , and smell .
d . sight , hearing , taste , smell , and touch .

6- Echo help bats and dolphins to locate ….. of their preys
a . The location . b . The color c . the smell , d . The taste .

7-Dolphins depend on their sharp sense of …….to get food
a . Sight . b . taste . c . smell , d . hearing .

2- Put (√) or (X):

1. A human can identify music through ears which are organ of sight . ( )
2. The Egyptian mongoose can communicate with its species by making sounds . ( )
3. The sense of hearing of dolphins is stronger than that of human ( )
4. We use our sense of smell to identify the color of a flower . ( )
5. Skin helps human distinguish between the taste of different types of food through the sense of touch . ( )
6. A chameleon use its tongue to taste food ( )
7. Foxes have sharp of taste to avoid dangers ( )
8. Bats depend on camouflage property to find its food ( )

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3 Write the scientific term of each of the following : .

1. The property that depends on the sense of hearing through which dolphins locate their preys under water. (……)
2. The organ used to recognize different colors (……)
3. The organ used to recognize different odor (……)
4. The sense used to differentiate between smooth and rough surfaces(……)
5. The return back of sound waves on hitting a solid surface(……)

4 Complete the following sentences :

1. The dog uses the senses of ……and …….. in guarding
2. A human can pay attention to an alarm bell in case of danger through the sense of…….
3. Dolphins have sharp sense of …….. which they use to locate living organisms under water through the ..... .
4. We can identify the scent of flowers in spring using the organ of……..
5. Echo is the bouncing off ……waves when they hit a solid surface

5- Correct the underlined words :

1. The dog has sharp senses of smell and touch . (……...)
2. The dog uses its eyes to identify its owner's scent . (……...).
3. The fox uses its tail and ears to run away when it sees or hears its enemies . (……...).
4. Dolphins and dogs use echolocation property to hunt. (……...).

6- Give reasons for :

1. The Egyptian mongoose make sounds .

……..……..……..……..……..……..……..……..……..…

2. Owls can hunt during the night .

……..……..……..……..……..……..……..……..……..…

3. Dogs are used in guarding .

……..……..……..……..……..……..……..……..……..…

4. Dolphins can hear all kinds of sound .

……..……..……..……..……..……..……..……..……..…

8 What happens if ... ?

1. The sound waves produced by a dolphin when they hit an object under water.

……

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lesson (2) Super Senses

Activity 5

Look at the following pictures and then answer the opposite questions

• Can a human see everything clearly inside a dark room?

Yes ☐ No ☐

An owl can see its prey in the dark during nighttime ?

Yes ☐ No ☐

- You can hear the noise of something small moving through the darkness, but you cannot see it clearly to.
- Some animals can look for their food at night using their super senses, these animals that become active at night are known as " Nocturnal Animals".

- يمكنك سماع ضجيج شيء صغير يتحرك في الظلام ، لكن لا يمكنك رؤيته بوضوح.
- يمكن لبعض الحيوانات البحث عن طعامها ليلاً باستخدام حواسها الخارقة ، وتعرف هذه الحيوانات التي تنشط ليلاً باسم "الحيوانات الليلية".

Nocturnal animals: الحيوانات الليلية

They are animals that become active at night to look for their food.

هي حيوانات تنشط ليلاً للبحث عن طعامها :

Why some animals become active at night ?

1. Because the at night becomes cool enough.
2. Because the preys are available at night only.:
3. to hide from their preys dark and surprise them.

لماذا تنشط بعض الحيوانات في الليل؟ 1.لانه يصبح باردًا بدرجة كافية 2- لأن الفرائس تتواجد ليلاً فقط 3- للاختباء فى الظلام الدامس من فرائسها ومفاجأتها

How can nocturnal animals hunt at night without the need of light?:

كيف يمكن للحيوانات الليلية أن تصطاد ليلاً دون الحاجة إلى الضوء؟:

Super Sensory Adaptations: Bats cannot see very well in the dark, but they are able to use echolocation property (like dolphins) using sound waves to find their food in the dark using their hearing sense.

التكيفات الحسية للخفافيش: لا تستطيع الخفافيش الرؤية جيدًا في الظلام ، لكنها قادرة على استخدام خاصية تحديد الموقع بالصدى (مثل الدلافين) باستخدام الموجات الصوتية للعثور على طعامها في الظلام باستخدام حاسة السمع.

1. Bat

Purpose: To locate their preys (as insects) and other bodies in their surroundings in the dark using the echo.

الغرض: تحديد موقع فرائسها (كحشرات) وأجساد أخرى في محيطها في الظلام باستخدام الصدى.

Bat use echolocation property to find their food

الخفافيش تستخدم خاصية تحديد الموقع للعثور على طعامها

2. Owl Super Sensory Adaptations:

البومة فائقة الحسية التكيفات

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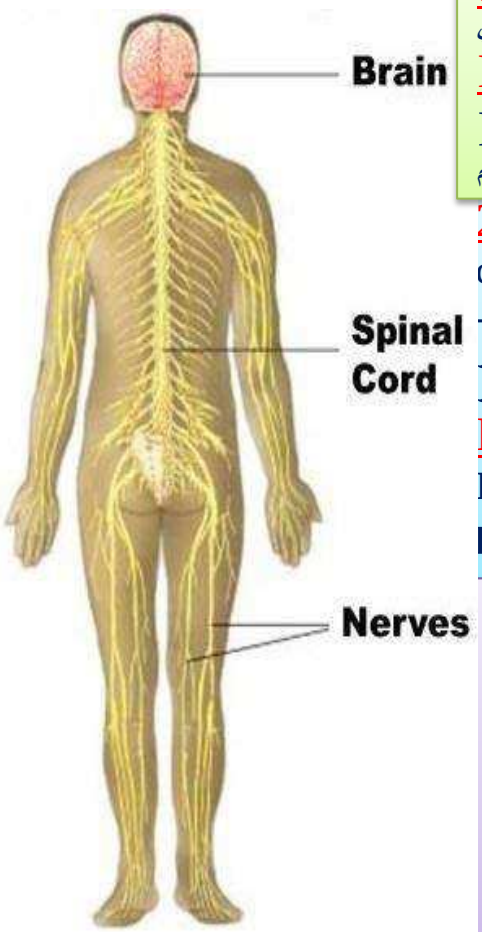
- Owls have both extraordinary eyesight and hearing.
تتمتع البوم ببصر وسمع غير عاديين
- The bowl-shaped faces and feathers in owls' heads help them detect, amplify and direct distant sounds directly into their ears
تساعد الوجوه والريش على شكل وعاء في رؤوس البوم على اكتشاف الأصوات البعيدة وتضخيمها وتوجيهها مباشرة إلى آذانهم.
- When animals making the noise are hiding within grass or under snow, the strong hearing sense of the owl allow it to detect their slight and faraway movements.
عندما تختبئ الحيوانات التي تصدر الضوضاء داخل العشب أو تحت الثلج ، فإن حاسة السمع القوية للبومة تسمح لها باكتشاف حركاتها الطفيفة والبعيدة
- Owls can rotate their heads in all directions, so that they can search for preys everywhere. تستطيع البوم أن تدير رؤوسها في كل الاتجاهات ، حتى تتمكن من البحث عن الفرائس في كل مكان
Purpose: To detect the movements and sounds of tiny faraway preys.
Check your understanding
الغرض: الكشف عن حركات وأصوات الفرائس الصغيرة البعيدة. تأكد من فهمك .

Activity 6 The Nervous System

- Mammals such as human, elephant and dog have the same structure of nervous system. Human nervous systems The nervous system consist of:
الثدييات مثل الإنسان والفيل والكلب تمتلك نفس بنية الجهاز العصبي. الجهاز العصبي البشري يتكون الجهاز العصبي من



1 -Brain : It is connected to the spinal cord.
الدماغ.يرتبط بالحبل الشوكي
Its function:
It is the main control center in the body.
مركز التحكم الرئيسي في الجسم

2- Spinal cord: - It consists of many nerves that are collected together and run through the backbone
- It is branched into smaller and smaller nerves.
النخاع الشوكي: - يتكون من العديد من الأعصاب التي تتجمع مع بعضها البعض وتمر عبر العمود الفقري يتفرع إلى أعصاب أصغر فأصغر
Its function: وظيفته
It carries messages from the brain to the body parts and vice versa يقوم بنقل الرسائل من المخ إلى أجزاء الجسم وبالعكس .

3 -Nerves : Nerves are distributed throughout the body and connect the sense organs and the body parts with the brain.
الأعصاب: تنتشر الأعصاب في جميع أنحاء الجسم وتربط أعضاء الحس وأجزاء الجسم بالدماغ.
Their function
They carry messages from the brain to the spinal cord and other parts of the body and vice versa
وظيفتها: تنقل الرسائل من الدماغ إلى النخاع الشوكي وأجزاء أخرى من الجسم والعكس3

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تستقبل الاعضاء الحسية (العيون - الأذنين - الأنف - اللسان - الجلد) المعلومات من محيطها

The nerves spread across the whole body connect the sensory organs with brain. تنتشر الأعصاب في جميع أنحاء الجسم وتربط الأعضاء الحسية بالدماغ

Sensory organs (eyes - ears - nose - tongue - skin) contain a special type of nerves known as sensory receptors

تحتوي الأعضاء الحسية (العيون - الأذنين - الأنف - اللسان - الجلد) على نوع خاص من الأعصاب يعرف بالمستقبلات الحسية

Sensory receptors: They are nerves found in different places of the body, and they are responsible for receiving information from the surroundings. المستقبلات الحسية: وهي أعصاب توجد في أماكن مختلفة من الجسم ، وهي مسؤولة عن تلقي المعلومات من البيئة المحيطة.

The nervous system and pizza

• How does the human body respond to an external stimulus like the smell of pizza?

1. The sense organ (nose) receive that information from environment which is the pizza's odor

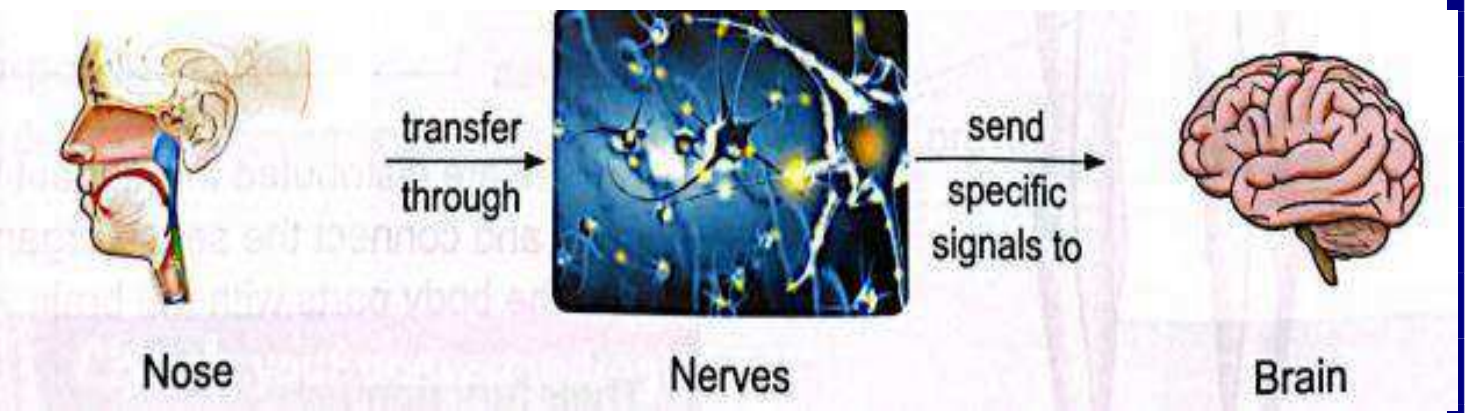
1. عضو الإحساس (الأنف) يتلقى هذه المعلومات من البيئة التي هي رائحة البيتزا..

2. Then the sensory receptors of smell that are found in the back of your nose send a specific signals along the nerves to your brain.

ثم ترسل المستقبلات الحسية للشم الموجودة في مؤخرة أنفك إشارات محددة على طول الأعصاب إلى دماغك.

3. The smell information reaches your brain the brain it processed and determining the type of the food.

3. وصول معلومات الرائحة إلى دماغك يقوم بمعالجتها وتحديد نوع الطعام.



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Activity 8 Sensing the Environment

• When this small animal hears a snake moving nearby, it jumps quickly in less than one second.

• عندما يسمع هذا الحيوان الصغير ثعبانًا يتحرك بالقرب منه ، فإنه يقفز بسرعة في أقل من ثانية واحدة.

Avoiding danger in humans and animals :

The different parts of the nervous system (sensory receptors, nerves, spinal cord and brain) are responsible for sensation and delivering messages.

تجنب الخطر على الإنسان والحيوان الأجزاء المختلفة من الجهاز العصبي (المستقبلات الحسية ، الأعصاب ، النخاع الشوكي والمخ) هي المسؤولة عن الإحساس وتوصيل الرسائل .

Jumping Jerboa : الجربوع القافز

The Egyptian jerboa is a species of desert rodents .

الجربوع المصرية هي نوع من القوارض الصحراوية

It is a tiny animal with very large ears, small eyes and long hind legs.

إنه حيوان صغير ذو أذنين كبيرتين وعينين صغيرتين وأرجل خلفية طويلة

Adaptation to the Environment

A jerboa has **large and sensitive ears**, so that it can hear quiet snakes, **(Structural adaptation)**

يمتلك الجربوع آذانًا كبيرة وحساسة ، بحيث يمكنه سماع صوت الثعابين الهادئة (التكيف التركيبي)

A jerboa's **feet and toes have hair** to help it catch sand when it jumps. It hops in zigzag paths to be able to run away quickly from danger., **(behavioral adaptation)**

تحتوي أقدام الجربوع وأصابع قدميها على شعر يساعدها على التقاط الرمال يقفز في مسارات متعرجة ليتمكن من الهروب بسرعة من الخطر. (التكيف السلوكى)

(Structural adaptation)

Jerboa has long hind legs that enable it to jump a long distance .

يمتلك الجربوع أرجل خلفية طويلة تمكنه من القفز لمسافات طويلة(التكيف التركيبي).

How do all parts of a jerboa's body work together to avoid danger?

When snakes make noise as they approach a jerboa:

1-The **sensory receptors** in a jerboa's ears send a message through a network of nerves to the brain,

1- المستقبلات الحسية في آذان الجربوع ترسل رسالة عبر شبكة من الأعصاب إلى الدماغ ،

2-The jerboa's **brain then translates this message** and responds by alerting its legs to start moving

2-ثم يترجم دماغ الجربوع هذه الرسالة ويستجيب بتنبيه ساقيه لبدء الحركة

3-The jerboa's **strong hopping legs starts to jump away** from the danger in **zigzag paths**.

3-تبدأ أرجل القفز القوية للجربوع في القفز بعيدًا عن الخطر في المسارات المتعرجة

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- In the above example, the whole response process of a jerboa running away from danger occurs in less than one second.

The time taken by a jerboa to react to danger is known as the "reaction time".

- في المثال أعلاه ، تحدث عملية الاستجابة الكاملة لجربوع وهو يبتعد عن الخطر في أقل من ثانية واحدة.
يُعرف الوقت الذي يستغرقه الجربوع للرد على الخطر باسم "وقت رد الفعل

Reaction Time: It is the time taken by an organism's body to response and react to different stimuli around it. . like danger.

زمن رد الفعل: هو الوقت الذي يستغرقه جسم الكائن الحي للاستجابة والتفاعل مع المنبهات المختلفة المحيطة به.. مثل الخطر.

How does the jerboa respond to danger compared to a human?

1-Both human and jerboa avoid danger by relying on sensory receptors nerves and a brain to sense and communicate messages

2-Both human and jerboa move quickly away from danger for their safety,

Examples

-**Human** moves quickly his hand away. when it touches the spines of a cactus plant.

الإنسان يتحرك بسرعة بيده بعيدا عندما تلمس أشواك نبات الصبار.

-**Jerboa** hops in **zigzag** patterns, so it can escape quickly from danger.

يقفز الجربوع في أنماط متعرجة ، حتى يتمكن من الهروب بسرعة من الخطر.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
cool enough	باردًا بدرجة كافية	jumps quickly	يقفز بسرعة
nocturnal animals	للحيوانات الليلية	Jumping Jerboa	الجربوع القافز
Super Sensory	فائق الحسية	hopping legs	أرجل القفز
control center	التحكم الرئيسي	long hind legs	رجل خلفية طويلة
Brain	الدماغ	danger	خطر
Nervous System	الجهاز العصبي	translates	يترجم
sensory receptors	المستقبلات الحسية	zigzag paths	المسارات المتعرجة
signals	إشارات	Reaction Time	زمن رد الفعل
smell	الشم	cactus	الصبار
information	المعلومات	desert rodents	قوارض الصحراء
reaches	تصل	communicate	يتواصل

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Exercises on Lesson (2)

1-Choose the correct answer?

1. The senses upon which you depend to hold a small radio playing at low volume in a dark room are .....

a . hearing and smell b . touch and taste .

c . smell and taste . d . hearing and touch .

2. The responsible system for moving your hand away from danger , such as touching a hot cup of tea, is the……. system .

a. digestive b . respiratory c . nervous d . urinary

3. When snakes make a noise, the sensory receptors found in jerboa's ……send a warning message to the brain .

a . ears b . nose c . feet d . teeth

4-The brain , as the control center of the nervous system , can deal with……at the same time

a . two senses only b . three senses only c . four senses only d . all the five senses

5. Animals that become active at night are called……

a . diurnal animals. b . nocturnal animals

c . extinct animals. d . endangered animals

6. When your hand touches the spines of a cactus plant , it is withdrawn in

a. less than one second b . one minute c. two minutes d . one hour

7. When a jerboa hears the sound of a moving snake , it …….

a. remains standing in its place b . jumps to hunt the snake .

c. makes sounds to frighten the snake d . jumps quickly to run away from the snake

8. The organ that processes the information collected through the sense of sight is

a . the spinal cord b . the nerves c . the brain d . the eyes .

9 . The nervous system of mammals consists of

a. the brain only b . the spinal cord only .

c. nerves and the spinal cord only d. the brain , the spinal cord and nerves

10. Both the spinal cord and nerves .....

a . are located in the backbone b . are located in the small intestine .

c . transmit messages from the brain to all parts of the body only .

d . transmit messages from the brain to all parts of the body and vice versa

11 . Which of the following choices explain how the body reacts to the smell of food in the correct order ?

a . Brain → Nose → Nerves b . Nose → brain → Nerves

c . Nerves → Brain → Nose d . Nose → Nerves → Brain

12 . The correct order for a bat to locate a mosquito , is

a, mosquito makes a sound → reaches bat → returns to mosquito

b. bat makes a sound → reaches a wall → returns to mosquito

c. mosquito makes a sound → reaches a wall → returns the mosquito

d. bat makes a sound → reaches mosquito → returns to the to bat

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13. Owls have all the following properties that give them greater ability to sense distant preys making low sounds , except ……

a. large eyes b . a bowl - shaped face ..

c. a head that turns in all directions . d . weak sense of hearing .

14. The owl's large eyes and bowl - shaped face considered as ..... adaptation .

a . only structural b . only behavioral

c . both structural and behavioral d . neither structural nor behavioral

15. Flying bats don't hit different objects at night because they can……..

a . see them clearly in darkness . b. touch them .

c . smell them . d . hear the echo reflected from them .

16. Some animals become active during the night due to the following reasons except that

a . the night is characterized by the cool weather .

b . the night is a good time for relaxation and rest .

c . the night is quiet , so that they can hear preys .

d . the night is a time when preys are available .

17. Both bats and mosquitoes become active during night . Which of the following statements is correct ? .....

a . Both can swim well . b . Both can run fast

c . Bats prey on mosquitoes d . Mosquitoes prey on bats .

2 Choose from column (B) what suits it in column (A) :

1-

(A)	(B)
l. Bat	a. It is a flying nocturnal animal that can hear the quiet movements of rats
2. Owl	.b . It is a desert rodent that has large and sensitive ears.
3. Snake	c. It is a non-flying mammal
	d. It is a flying nocturnal animal that sound reflects to it after hitting insects

1 .. ……. 2 . ……. 3……...

2-

(A)	(B)
1. Sensory receptors	a . It is the main control centre in an animal body
2. Nerves	b . They are electrical impulses that reach the brain
3. Brain	c . It is found in the backbone and transmit messages between the body and the brain
4. Spinal cord	d . They are found on the sensory organs , and the first to sense the surrounding environment
	e . They receive information from the sensory receptors

1 .. ……. 2 . ……. 3……... 4-……..

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3- Put (√) or (X):

2. Animals that are active during the daytime are called the nocturnal animals ( )

2. The Egyptian jerboa lives in forests ( )

3. The Egyptian jerboa has large ears which help in sensing the snakes . ( )

4. The owl depends on the echo to determine the location of preys within the grass or beneath the snow . ( )

5. A bat makes sounds that hit insects and then bounce back to it , thus the bat can locate them ( )

6.The body senses and systems work separately when animals run away from their enemies . . ( )

6. A snake has the ability to sense the cold bodies of preys using a special part of its face( )

7. Some animals have abilities that humans do not have , and these abilities are called super sensory adaptations ( )

7. The spinal cord is the main control center of the body , which carries messages from and to the brain . ( )

8. The sensory receptors in the eyes receive the sound produced by a radio and send it to the brain . ( )

9. The Egyptian jerboa can jump for long distances depending on its long hind legs . ( )

10. Hopping of the jerboa in zigzag patterns to run away from danger is considered as a structural adaptation . ( )

11. The spinal cord is the main control center of the body, which helps carry messages from and to the brain. ( )

12. The heart and eyes are connected to the brain through blood vessels that transmit information in the form of electrical impulses ( )

13. The habitat of the jerboa is similar to that of the polar bear ( )

14 . The tongue is the sensory organ responsible for taste , which sends messages to the brain to be processed and therefore , identifying the food type ( )

4- Write the scientific term of each of the following :

1. A group of different animals that look for their preys at night (……)

2. A desert rodents with a small body , large ears and long hind legs (……..…)

3. A property by which a bat can locate its prey insects through the sound reflected from them. (……)

4. An animal that can turn its head backwards, and has a bowl - shaped face and large eyes . (……)

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5. A system that controls all the body functions, and nerves are one of its parts. (…….……)

6. The organ responsible for processing information transmitted to it, (……)

7. An organ composed of a group of nerves located in the backbone, and sends messages from and to the brain . (……)

8. Organs include the eyes, nose , ears , tongue and skin , and they receive information from the surroundings and send it to the brain (……)

9. A type of nerves in the sensory organs that is responsible for receiving information from the environment . (……)

10. The time taken by an organism's body to respond to different reactions (……)

5- Correct the underlined words :

1. The digestive system delivers messages through a network of nerves around all body parts (……)
2. The long hind legs of jerboa are consider as behavioral adaptation(……)
3.The spinal cord passes through the mouth . (……)
4. The organ that is responsible for receiving , processing and responding to information is the heart . (……)
5. A jerboa's feet and toes are covered with feathers (……)
6. The sense of sight of owls is weaker than that in bats . (……)
7. When hand spines of a cactus plant you moves away it slowly (……)
8.The tongue is the sensory organ that is responsible for smelling sour lemon. (……).
9. When a bat sends a sound against a wall , it returns to it . This phenomenon is called camouflage . (……)

6 Give reasons for :

1. Animals that live in hot regions become active at night .

……..……..……..……..……..……..……..……..…

2. Owls have bowl - shaped faces .

……..……..……..……..……..……..……..……..…

3.Bats can catch insects in the dark

……..……..……..……..……..……..……..……..…

4.Owl is nocturnal animal

……..……..……..……..……..……..……..……..…

5-The Egyptian jerboa can jump for a long distances . .

……

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6. The presence of hair on the Egyptian jerboa's feet and toes .

…….

7. The Egyptian jerboa's ears play a very important role in its survival .

……

7-What happens if ... ?

1-Bats lose the ability to hear by using echolocation property .

……..……..……..……..……..……..……..……..…

2. Owls cannot turn their heads in all directions .

……..……..……..……..……..……..……..……..…

3. Your hand touches the spines of barbary fig plant .

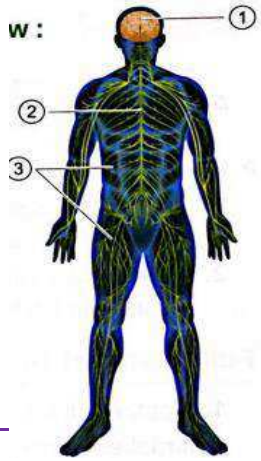
…….

4. The Egyptian jerboa hears a snake moves towards it .

…….

9 Look at the opposite figure , then answer the questions below :

What does the figure represent ? ……..……..……..……



• Label the figure : (1)…… (2)…… (3)……

Complete :.

1. Number (……) is found inside the backbone of the human body .
2. Number (……) represents the main control centre in the human body
3. Number (……) spreads all around the human body parts

9- Arrange the following sentences according to how body parts of the Egyptian jerboa act to avoid danger :

(……)The brain alerts the jerboa's legs to start moving .

(……)The brain processes the message telling there is a danger .

(……) A jerboa hears a snake moves towards it .

(……)The jerboa jumps in zigzag paths to run away from the snake

(……). The sensory receptors found in jerboa's ears send a message to the brain

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lesson (3)

Functions nervous system

Functions nervous system

1. Collecting information through sensory organs like the eyes, ears and skin
2. Make sense of translation these information to the brain.
3. Tell the body what to do. According to this information

وظائف الجهاز العصبي .1جمع المعلومات من خلال الأجهزة الحسية مثل العينين والأذنين والجلد
2 .اجعل معنى ترجمة هذه المعلومات إلى الدماغ ، 3-فهم ما تعنيه هذه المعلومات

Example:

When the ears pick up sound waves coming from a chirping bird.
عندما تلتقط الأذنان الموجات الصوتية القادمة من طائر نقيق

The nerves in the ears send a message to the brain, which translates these sound waves.
ترسل الأعصاب الموجودة في الأذنين رسالة إلى المخ يترجم هذه الموجات الصوتية.

Then, the brain sends a message to the body about what to do, such as turn to look for the bird on a tree.
بعد ذلك ، يرسل المخ رسالة إلى الجسد حول ما يجب فعله ، مثل الالتفات للبحث عن طائر على شجرة.

Notes • Some messages, which are called reflex actions, are so fast that you cannot realize it. ملاحظات • بعض الرسائل ، التي تسمى إجراءات منعكسة ، سريعة جدًا بحيث لا يمكنك إدراكها.

• Other messages are sent from and to the brain automatically, like the signal to breathe. Understanding

يتم إرسال الرسائل الأخرى من وإلى الدماغ تلقائيًا ، مثل إشارة التنفس. فهم •

Activity 12 Describing the Nervous System

• The parts of the nervous system work together to :
- Sense the environment . - Interpret the information to decide the best action . - Send a signal to the body to react .

• Without all of the parts of the nervous system , the person might not receive , send or react to the information

.تعمل أجزاء الجهاز العصبي معًا من أجل إرسال إشارة إلى الجسم للرد •تفسير المعلومات لتحديد الإجراء الأفضل تحسس البيئة
بدون جميع أجزاء الجهاز العصبي ، قد لا يتلقى الشخص المعلومات أو يرسلها أو يتفاعل معها

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Exercises on Lesson (3)

1-Choose the correct answer?

1. Your sensation of hot weather depends on sensory receptors in the…….
a . eyes b . nose . c. ears d . skin .

2. Recognize thunder and lightning depends on your senses of…….
a . hearing and sight b . sight and smell .
c . hearing and touch d . hearing and taste .

3. Closing your eyes quickly when light rays fall on them suddenly represents.... … .
a . inhalation b . reflex c . countershading d . camouflage .

4.The nervous system gather information from the environment through
a. brain-nerves b. nerves-sensory organs
c. sensory organs - brain d. spinal cord-brain.

5. You opened the door of your house when you heard the doorbell . Which of the following statements explains the sequence of messages inside your body in this situation
a . Ears → brain → hand . b . Ears → hand → brain
c . brain → Ears → hand d . brain → nerve → feet.

6. You pass the football to a player in your team . Which of the following statements explains the sequence of messages inside your body in this situation ?
a . Feet → nerves → brain b . Nerves → feet → brain
c . Nerves → feet → nerves . d . Brain → nerves → feet .

7. If you smell smoke from something burning nearby , then you realized you had to move away fast . This means that there is an integration between the……. in this situation .
a digestive system and respiratory system b . digestive system and nervous system
c . respiratory system and nervous system d . nervous system and urinary system

8-All the following are from the importance of the nervous system in mammals except
a. gathering information. b. pushing blood through blood vessels
c. sending signals to the body parts to react. d. translating information.

2- Put (√) or (X):

1. The brain sends automatic signals so that we can breathe ( )
2. Blinking when something becomes near to your eyes is an example of reflexes( ).
3. Parts of the nervous system work together to gather and process information then send signals ( )
4.Your fingers send signals to the brain to distinguish between smooth and rough objects( )
5.Sensory organs are responsible for processing information( )
6.The function of the digestive system is distinguishing between hot and cold things ( )
7.The nerves inside the body connect all parts of the nervous system together ( )

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3 Write the scientific term of each of the following :

1.It delivers messages between the spinal cord and different body organs (…….)

2.The organs that receive information from the surrounding environment. (…….)

3. The sensory organ that can distinguish between sharp and rough voices(…….)

4.A sense by which you can recognize the sour taste of lemon(…….)

5.They are messages sent by the nervous system that are often so fast that you cannot realize them (…….)

4-Correct the underlined words ;

1. The muscles in the sensory organs within your body are responsible for receiving information from the surrounding environment . (…….)
2. When your eyes are closed , you can distinguish between your brother's voice and your friend's voice , depending on your sense of sight . (…….)
3. The spinal cord is responsible for processing sound waves coming through ears (…….)

5 Cross out the odd words

1. Smell - Taste - Eyes - Hearing . (…….)
2. Eyes - Nose - Skin - Taste . (…….)
3. Spinal cord - Lungs - Nerves - Brain . (…….)

6 Give reasons for :

1. Humans can recognize the sounds of different musical instruments .

……

2. The brain plays an important role in the function of the nervous system .

……

7- What happens if ...

1. The spinal cord became absent from the components of the nervous system

……

2. Sensory receptors related to the eyes stopped sending messages to the brain .

……

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Lesson (4) How animal use communication system

Technology systems allow humans to communicate with each other through:
تسمح أنظمة التكنولوجيا للبشر بالتواصل مع بعضهم البعض من خلال:
-Making phone calls.إجراء مكالمات هاتفية
-Sending text messages and e-mails.إرسال الرسائل النصية والبريد الإلكتروني
Animals don't use technology systems as we do, but they can still use other systems to communicate with each other.
لا تستخدم الحيوانات أنظمة تقنية كما نفعل نحن ، ولكن لا يزال بإمكانها استخدام أنظمة أخرى للتواصل مع بعضها البعض.

Ants:

•Ants live in colonies that contain thousands of individuals. • يعيش النمل في مستعمرات تحتوي على آلاف الأفراد.
Groups of ants within a colony has different roles, مجموعات النمل داخل المستعمرة لها أدوار مختلفة
where they have developed systems that help them divide their work among themselves,
حيث طوروا أنظمة تساعدهم على تقسيم عملهم فيما بينهم
so there are nurse ants, scout ants and soldier ants لذلك هناك نمل ممرض ، ونمل كشفي ، ونمل جندي

How do groups of ants communicate with each other?

كيف تتواصل مجموعات النمل مع بعضها البعض؟
1-The nurse ants When the food is low, they send smelly messages to scout ants which are responsible for locating food.
النمل الممرض عندما ينخفض الطعام ، يرسل رسائل كريهة الرائحة لاستكشاف النمل المسؤول عن تحديد مكان الطعام.
2-The scout ants respond by sending a smelly message to alert the ants where to find the food.
النمل الكشاف يستجيب بإرسال رسائل كريهة لتنبيه النمل بالعثور على الطعام
3-The soldier ants also use smelly messages to communicate if there is danger nearby.
النمل الجندي.يستخدم أيضًا رسائل كريهة للتواصل إذا كان هناك خطر في مكان قريب

Humpback whales

a ♫Humpback whales
sing under water to communicate with each other, where they sing a wide range of notes (tones) and a series of songs .
الحيتان الحدباء تغنى تحت الماء للتواصل مع بعضها فهى تغنى مدى واسع من النغمات المتواصلة
Humpback whales songs have different sounds depending on the season,

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In winter فى الشتاء	In summer فى الصيف
Mating season. فصل التزاوج	feeding season فصل التغذية
- High - pitched sound (soft) صوت عالى الدرجة (ناعم)	-Low - pitched sound (rough) صوت منخفض الدرجة (خشن)
High - pitched sounds travel better in cold water الصوت عالى الدرجة ينتقل افضل فى الماء البارد	Low-pitched sound travel better in warm water الصوت منخفض الدرجة ينتقل افضل فى الماء الدافىء

How does the bat use its ears for echolocation to get information about its surroundings in the dark?

كيف يستخدم الخفاش أذنيه لتحديد الموقع بالصدى للحصول على معلومات حول محيطه في الظلام؟

1-Bat makes a high-pitched sound
يصدر الخفاش صوتًا عالي النبرة

2-The sound hits something nearby the bat and reflects back to it in the form of "echo".
الصوت يخبط شيئًا بالقرب من الخفاش ويعود إليه في شكل صدي

3-Bat listens for the echo (reflected sound).
يستمع الخفاش إلى الصدى (الصوت المنعكس).

4-So, bat knows that there is something nearby.
لذلك الخفاش يعرف أن هناك شيئًا قريبًا.

Special cane of blind person	Bat

Similar

1- they emit a high - pitched sound that bounces off objects with an echo
يصدركل منهما صوت عالي الدرجة والذى يرتد من الاجسام محدثا الصدى

2-they receive the echo that can tell the objects يستقبلان الصدى والذى يخبرهم عن الاشياء

Differences

-The special cane picks up an echo from the sound and changes it into a vibration that can tell the blind person where objects are around him. تلتقط العصى الصوت وتحوله الى اهتزازات تخبر الكفيف بمكان تواجد الاجسام حوله	-Bats pick up an echo but they don't change it into vibrations تلتقطُ الخفافيش الصدى لَكنَّها لا تغيّره إلى الإهتزازاتِ

Bat Inspired technology الخفاش ملهم التكنولوجيا

Scientists have been inspired by bat echolocation to find ways to help blind detect their surroundings.

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العلماء استلهموا بانعكاس صوت الخفاش لمساعدة الكفيف لتحديد ما حوله

1-Scientists made a **special cane** that emits a **high - pitched sound** like bats do

العلماء صنعوا عصى خاصة تصدر صوت عالى الدرجة مثل الخفاش

2-As a **blind person** is walking with this cane, an **echo** of this **high- pitched sound** is picked up by this cane.

عندما يمشى الشخص الاعمى بهذة العصى يصدر منها صدى صوت تلتقطه هذة العصى

3-The **echo is turned into vibrations** that the person can feel with his thumb

الصدى يُتحوّلُ إلى اهتزازاتٍ يَشْعرَ بها الشخصِ بإبهامِه

5- The **vibrations of the special cane** tell the blind person the **direction** of the obstacles and objects around him.

اهتزازات العصا الخاصة تخبر الكفيف عن اتجاه العوائق والأشياء من حوله

Humans cannot hear the high-pitched sounds produced either from bats or the special carne of blind people.

لا يستطيع البشر سماع الأصوات العالية النبرة التي تنتجها الخفافيش أو العصا الخاص للمكفوفين.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Technology systems	أنظمة التكنولوجيا	feeding season	فصل التغذية
colonies	مستعمرات	Mating season	فصل التزاوج
Blind person	شخص أعمى	vibrations	اهتزازات
high - pitched sound	صوت عالى الدرجة	special cane	العصا الخاصة
soft	ناعم	blind person	الكفيف
Low - pitched sound	صوت منخفض الدرجة	listens	يستمع
rough	خشن	reflected sound	الصوت المنعكس
warm water	الماء الدافىء	echolocation	تحديد الموقع
nearby	بالقرب	Inspired	ملهم
echo	صدى	thumb	إبهامِ
_bounces	يرتد	receive	يستقبل

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Exercises on Lesson (3)

1-Choose the correct answer?

1. Sending smelly messages when there is a shortage of food is the role of
   a. queen ants b. nurse ants c. scout ants d. soldier ants.
2. Locating food is the role of
   a. queen ants b. nurse ants c. scout ants d. soldier ants.
3. Alarming the colony from dangers is the role of ……..
   a. queen ants b. nurse ants c. spring d. soldier ants.
4. Humpback whales sing during …….months, which is the mating season
   a. winter b. summer c. spring d. autumn
5. Sense organs collect information and send signals to…… for processing and understanding.
   a hands b. legs c. brain d. stomach
6. Bats use their ……..to get information about their surroundings in the dark
   a. nose b. tongue c. eyes d. ears
7. Echolocation in some animals is the use of …… pitched sounds for finding food
   a. medium b. low c. very low d. high
8. …….. use echolocation by bouncing high-pitched sounds in the air
   a. Bats b. Dolphins c. Whales d. Snakes
9. The echo is turned into that…. a blind man can feel in his thumb while holding his special cane.
   a. vibrations b. light c. heat d. water
10. The blind person's cane and…… emit a high-pitched sound that bounces off objects forming an echo
    a. lizards b. polar bears c. bull sharks d. bats
11. Songs of humpback whales in winter are characterized by each of the following except
    a having high-pitched sounds. b. travelling better through cold water
    c. having soft sounds d. having low-pitched sounds.
12. All the following sentences describe humpbacks' life, except
    a. they can communicate in cold and warm water.
    b. they mating in winter months. c they have a weak hearing sense.
    d. they communicate with each other through sounds.

2-Choose from column (A) what suits it in column (B) :

(A)	(B)
1. Nurse ants	a. are responsible for reproduction and laying eggs.
2. Scout ants	b. are responsible for warning from dangers.
3 Soldier ant	c. are responsible for locating food
	e. d are responsible for sending smelly messages when the amount of food decreases

1. …… 2. …… 3. ……

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3- Put (√) or (X):

1. It is impossible to design technology inspired by the adaptations of some living organisms around us. ( )
2. A special cane is invented to help a person who has lost the sense of hearing( )
3. The sound pitch from a blind person's cane is too high for humans to hear. ( )
4. Echo is turned into light that a blind man can feel while holding his special cane( )
5. Bats have the ability to change echo into vibrations just as the canes of blind persons do ( )
6. Animals use technological systems as we do. ( )
7. Animals communicate with each other by using different senses. ( )
8. Humpback whales communicate with each other through flashing. ( )
9 Humpback whales produce more than one type of songs ( )
10. Humpback whales can sing under water ( )
11. Sense organs can decode the information that is sent by the brain.. ( )

4. Correct the underlined words:

1. Groups of ants within a colony have similar roles (……)
2. Scout ants are responsible for alarming the colony in danger. (……)
3. Humpback whales have similar sounds according to the season. (……)
4. Humpback whales produce low-pitched sounds in winter (……)
5. Low-pitched sounds travel better through cold water (……)

5.Write the scientific term of each of the following

1. A season in which the humpback whale produces high-pitched sound. (……)
2. A season in which the humpback whale produces low-pitched sound (……)
3. Small living organisms that live in colonies and communicate with each other by smelly messages to perform different roles (……)
4. A group of ants which is responsible for sending smelly messages when there is a shortage of food. (……)
5. Pitched sounds which travel through cold water better than through warm water. (……)
6. Pitched sounds which travel through warm water better than through cold water (……).
7. Sense organ that can detect sound energy(……).
8. Sense organ that can detect light energy. (……)
9. A living organism that can fly and depend on the echolocation property to get information about its surroundings in the dark (……).
10. A simple tool (device) used by blind people to walk safely (……).

6-Give reasons for:

1. The nurse ants send smelly messages to scout ants

……

2. The soldier ants use smells in their communication.

……

3. The songs of humpback whales have high-pitched sounds during winter months.

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……

4. Humpback whales sing different songs.

……

5. The echo that is picked up by the special cane of blind people is turned into vibrations.

……

6. The blind people cannot hear the sound that emits from their special canes

……

8 -What happens if

1. The smell sense of ants becomes weak.

……

2. The amount of food in the ants colony decreases

……

3. There is a danger near to an ants colony.

……

4. High-pitched sound that is produced by the blind person's cane hits an object.

……

5. Bats cannot use echolocation property.

……

6. There is a wall in front of a blind person uses his special cane

……

7. The hearing sense of humpback whales becomes weak,

……

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Concept (3) Lesson (1)

Light and sight

Light and sight

Activity

Can You Explain

Fishing cat قط الصيد

Human الانسان

Some animals have some super sensory adaptations to survive.

Humane and animals have a nervous system that sends information from the sense organs to the brain through the nerves for processing and perception.

بعض الحيوانات لديها بعض التكيفات الحسية الفائقة للبقاء على قيد الحياة يمتلك الإنسان والحيوان جهازًا عصبيًا يرسل المعلومات من أعضاء الحس إلى الدماغ عبر الأعصاب للمعالجة والإدراك.

Do you know what is the organ that is affected by light in humans and animals and how they can see things in low-light places?

هل تعلم ما هو العضو الذي يتأثر بالضوء في الإنسان والحيوان وكيف يمكنهم رؤية الأشياء في الأماكن منخفضة الإضاءة؟

The eye is the organ of sight that is affected by light in humans and animals.

العين هي عضو البصر الذي يتأثر بالضوء عند الإنسان والحيوان.

Humans cannot see in the dark, but they need light to gather information about what is happening around them.

لا يستطيع البشر الرؤية في الظلام ، لكنهم يحتاجون إلى الضوء لجمع المعلومات حول ما يحدث حولهم.

Some animals have a spectacular night vision, which enables them to see at night such as:

بعض الحيوانات:تتمتع برؤية ليلية مذهلة تمكنها من الرؤية في الليل مثل

Night vision in humans: الرؤية الليلية عند البشر :

- Human eyes need more light to see well in the low-light places.

in low light humans would need a device known as "night vision goggles" to see in the dark.

• تحتاج عيون الإنسان إلى مزيد من الضوء لتتمكن من الرؤية جيدًا في الأماكن ذات الإضاءة المنخفضة.
للرؤية في الظلام ;(نظارات الرؤية الليلية;) بدون مزيد من الضوء ، سيحتاج البشر إلى جهاز يُعرف باسم نظارات الرؤية الليلية

Night vision in animals: الرؤية الليلية عند الحيوانات:

The structure of eyes of some animals help them see in the dark such as the fishing Cat تساعد تركيب عيون بعض الحيوانات على الرؤية في الظلام مثل قطة الصيد :

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The fishing cat قطة الصيد

-It is a wild cat and considered as one of nocturnal animals that hunts for food at night. -

هي قطة برية وتعتبر من الحيوانات الليلية التي تبحث عن الطعام في الليل

-The fishing cat's eyes seem to glow in the dark because:

تبدو عيون قطة الصيد متوهجة في الظلام بسبب

1-It has a mirror-like membrane at the back of its eyes.

لها غشاء يشبه المرآة في الجزء الخلفي من عينيه

2- When the light enters the fishing cat's eyes, it bounces (reflects) off this membrane, allowing its eyes to collect more light.

عندما يدخل الضوء إلى عيون قط الصيد ، فإنه يرتد (ينعكس) عن هذا الغشاء ، مما يسمح لعينيه بجمع المزيد من الضوء

-This structural adaptation of the fishing cat's eyes, is found in all cats and allow them to have excellent night vision to hunt in the low-light places

هذا التكيف الهيكلي لعيون قط الصيد ، موجود في كل القطط والسماح لهم برؤية ليلية ممتازة للصيد في الأماكن ذات الإضاءة المنخفضة -

Points of comparison	Humans	Nocturnal animals
Size of the eye	Small eye	Big eye
Eye pupil	Opens narrower	Opens wider (to allow more light enter their eyes)

Some nocturnal animals can see in the weakest light levels,

but in complete darkness they depend on other senses such as hearing and smelling that help them to hunt their preys and to avoid their predators

بعض الحيوانات الليلية يمكن أن ترى في أضعف مستويات الضوء ،

لكنها في الظلام الدامس تعتمد على حواس أخرى مثل السمع والشم الذي يساعدها على اصطياد فرائسها وتجنب مفترساتها

What happens if...? ماذا يحدث إذا ...؟

The fishing cat eyes have no mirror-like membrane.

عيون قطة الصيد ليس لها غشاء يشبه المرآة

It cannot see clearly and hunt at nights

لا تستطيع أن ترى بوضوح وتطارد في الليل .

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Sources of light: مصادر الضوء

A source of fight: emits (gives off) its own light

Examples of sources of light أمثلة لمصادر الضوء

The Sun	Electric lamps	Candles	Flashlight	Fire
الشمس	مصابيح الكهربائية	الشموع	الكشاف	النار

not sources of light ليست مصادر ضوء

The objects that don't emit light, but they reflect the light falling on them, so they are such as: الأشياء التي لا تشع ضوءًا ، لكنها تعكس الضوء الساقط عليها ، لذا فهي مثل:

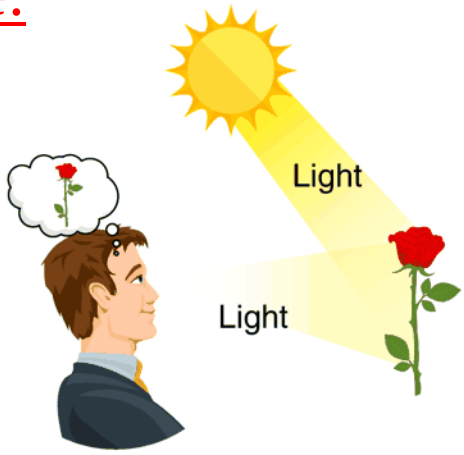
the moon (reflects the sunlight) القمر يعكس ضوء الشمس

The mirror (reflects the light) المراه تعكس الضوء

How we see:

When the source of light emits light rays that fall on objects, the light rays bounce these objects to our eyes to see them, as shown in the picture below.

عندما ينبعث من مصدر الضوء أشعة ضوئية تسقط على الأشياء ، فإن أشعة الضوء ترتد هذه الأجسام إلى أعيننا لرؤيتها ، كما هو موضح في الصورة أدناه.



Light:

It is a visible form of energy that travels in the form of waves.

الضوء إنه شكل مرئي من أشكال الطاقة ينتقل في شكل موجات:

In complete darkness, we can't see anything because without light bouncing off the objects into our eyes, everything will look black.

في الظلام الدامس ، لا يمكننا رؤية أي شيء لأنه بدون ارتداد الضوء عن الأشياء في أعيننا ، سيبدو كل شيء أسودًا.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Electric lamps	مصابيح الكهربائية	Flashlight	الكشاف
Candles	الشموع	Fire	النار
waves	موجات	reflects the light	تعكس الضوء
visible	مرئي	moon	القمر
nocturnal animals	الحيوانات الليلية	The mirror	المراه
Eye pupil	حدقة العين	fishing cat's	قطة الصيد
Opens wider	تتسع أكثر	Night vision	الرؤية الليلية
Opens narrower	تضيق أكثر	night vision goggles	نظارات الرؤية الليلية
mirror-like membrane	غشاء يشبه المرآة	low-light places.	الإضاءة المنخفضة
waves.	موجات	nights	الليل
clearly	بوضوح	hunt	يصطاد

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Concept (3)

Exercises on Lesson (1)

1-Choose the correct answer?

1. Which of the following organs are working together for seeing different objects ?
a Nose and brain. b. Eyes and brain c. Ears and brain d. Tongue and brain.

2. Humans have…… eyes than nocturnal animals
a. bigger b. smaller c. stronger d. sharper

3 The pupils of human eyes open ……that of nocturnal animals
a. typical to b. narrower than c. wider than d. similar to

4.The wide pupils of fishing cat, allows…… amount of light enter its eyes than those of human eyes.
a. little b. large c. very small d. small

5. Nocturnal animals depend on all the following senses to find out their preys at night, except
a. sight sense b. hearing sense. c. taste sense d. smell sense.

6-The mirror-like membrane of the fishing cat is present .
a. inside the stomach b. at the back of the brain
c. inside the lungs d. at the back of the eye

7. Which of the following do not need a big amount of light to see in the dark?
a. Both humans and cats b. Neither humans nor cats
c. Cats only d. Humans only

8- To detect the place of a table in a completely dark room you can depend on
a. sight sense. c. taste sense. b. touch sense. d. hearing sense.

9. If someone walking in a dark place without hitting anything around him, so this person may
a. have a big ability to taste. b. have a big ability to breathe.
c. have a big ability to smell. d. wear a night vision goggles.

10. The character that helps the fishing cat to hunt a prey at night, is its ability
a. to see the sunlight. b. of poor night vision.
c. to digest its prey easily. d. of excellent night vision

11. The eyes of fishing cats glow at night, because their eyes.....
a. emit their own light b. can reflect light. c. are small in size d. have narrow pupils.

12. The sight process occurs as follows.....
a. light falls on the eyes, then reflected to the objects.
b. light falls on the objects, then reflected into the eyes.
c. sound falls on the ears, then reflected to the objects.
d. sound falls on the objects, then reflected into the ears.

13. The function of the mirror-like membrane in the fishing cat's eyes, looks like the function of
a. night vision goggles. b. radio.
c. black paper. d. white paper.

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14. In the fishing cat's eyes, the mirror-like membrane is an important structure because it helps them to at night.
a. sleep b. breathe c. keep their body warm d. hunt a prey
15. All the following things are considered as light sources, except. (Cairo 2022)
a. the Sun. b. fire. c. eyes. d. the light lamp.
16. We can see both the Sun and the moon, because light...
a. bounces off both of them.
b. is emitted from both of them.
c. bounces off the Sun and is emitted from the moon.
d. bounces off the moon and is emitted from the Sun.
17. The energy which must present to make our eyes able to see the objects around us is.....energy(Cairo 2022
a. sound b. electric c. light d. magnetic

2- Put (√) or (X):

1. Eyes are considered as sensory organs of light as a source of light ( )
2 Sight is one of the five senses at which humans and animals depend on to see the surroundings. ( )
3 Cats have excellent night vision, while snakes and bats are not ( )
4. Both of the moon and the cat's eyes reflect the light that falling them
5.The mirror-like membrane that is present at the back of a fishing cat's eyes, is not present in other cat species ( )
6.We can see the mirror that presents in a completely dark room ( )
7.Big eyes of fishing cat allow to gather and reflect any little amount of light ( )
8.If the human has a mirror-like membrane at the back of his eyes, he can see clearly in the low-light places ( )
9.The light that enters the human eyes allows him to distinguish between weak and strong sounds ( )
10.The moon is not considered as a light source ( )
11.We can see the moon although it doesn't emit any light ( )

3 Complete the following sentences using the words below:

(source of light-mirror-like membrane-more light-bounce off)

1-Human eyes need ……..to see well
2-All cats have a …….membrane on the back of their eyes
3-any object that gives off its own light is called . ……
4-We can see objects when the light rays ……. these objects to our eyes

4.Write the scientific term of each of the following

1-The organ that is affected by light and responsible for sight. (……..)
2. A species of wild cats whose eyes glow at night . (……..)
3-Objects that emit their own light (……..)
4-The organ that is responsible for processing information received by eyes to know and .recognize the surroundings (……..)

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5-A body that appears lighted in the sky at night, but it is not considered as a source of light (……..)
6- A tool that the human can depend on to see in the dark. .(……..)
7. The structural adaptation that gives fishing cat an excellent night vision(……..)
8.The visible form of energy that enables us to see (……..)

5.Correct the underlined words:

1. Humans and cats are similar in their seeing ability at night (……..)
2.The energy that helps humans and animals see, is the sound energy(……..)
3-The Moon is one of the light sources in the sky. .(……..)
4. The system that works with the eyes of living organisms for seeing objects is the digestive system(……..)
5 Cats eyes glow at night due to the presence of a mirror-like membrane on the front of their eyes(……..)
6. Sound is a visible form of energy that bounces off objects into our eyes (…….....)
7. Eyes send messages to the heart for processing information(……..)
8. In a completely dark room, everything look red due to the absence of light. (……..)

6-Give reasons for

1.The fishing cat eyes seem to glow in the dark
……
2.Candle is considered as a source of light
……
3.We can see the Moon shining at night although it is not a source of light
……

7-What happens if……?

1.The mirror-like membrane in the fishing cats eyes is damaged
……
2-The Moon can't reflect light
……
3.The sensory receptors of fishing cats eyes are damaged
……

8-Cross out the odd word

1. Flashlight-The Moon-Fire (……..)
2. The Moon-Mirror-Candle (……..)

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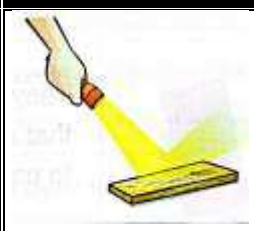
Lesson (2) Light reflection

Activity 8 Reflection

Materials: a flashlight - a mirror - a piece of wood - a piece of plastic - a piece of metal - a piece of cloth - paper.

Step	Figures	Observations
1. Turn on the flashlight and direct it towards a mirror.		-The mirror reflects most amount of the light.
2. Turn on the flashlight and direct it towards a piece of wood.		-The piece of wood reflects less amount of the light.
3. Repeat the previous step using the other materials.		

Conclusions: الاستنتاجات :

1. Shiny and smooth materials reflect large amount of the light that falls on them, such as the mirror and the piece of metal.

1. تعكس المواد اللامعة والناعمة قدرًا كبيرًا من الضوء الذي يسقط عليها ، مثل المرآة وقطعة المعدن.

2. Rough materials reflect small amount of the light that falls on them, such as the piece of wood, the piece of plastic, the piece of cloth and paper.

2. تعكس المواد الخشنة كمية صغيرة من الضوء الذي يسقط عليها ، مثل قطعة الخشب وقطعة البلاستيك وقطعة القماش والورق.

Activity 9

Light Strikes Matter

Light strikes matter

• Light is a form of energy that always travels in straight lines in the form of wave ,

When traveling light hits an object :

- Some of the light energy is absorbed.
- Some of the light energy may go through the object.
- Some of the light energy reflects off (bounces off) the object's surface.

• Objects that light cannot pass through are called "opaque".

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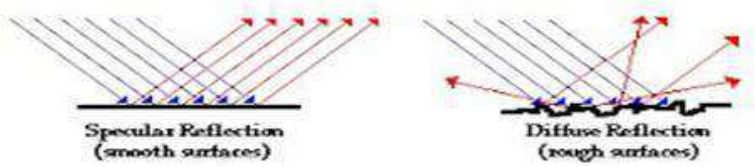
Opaque objects: اجسام معتمة	Transparent objects: اجسام شفافة
They are objects that don't allow light to pass through. إنها أشياء لا تسمح بمرور الضوء	They are objects that allow light to pass throug Things can be seen through transparent objects إنها مواد تسمح للضوء بالمرور من خلال الأشياء الشفافة على المواد
Examples of opaque substance : plastic, wood and metal البلاستيك والخشب والمعدن .	Examples of transparent substances : air, water, windows and lenses. الهواء والماء والنوافذ والعدسات

The reflected light depends upon the smoothness of the surface :

Smooth Surface سطح أملس	Rough surface
- If the surface is smooth (such as a mirror), the light rays will reflect in one direction with the same angle at which they strike (hit) the object originally إذا كان السطح أملسًا (مثل المرآة) ، فإن أشعة الضوء ستنعكس في اتجاه واحد بنفس الزاوية التي تصطدم بها (تضرب) الجسم في الأصل	-If the surface is rough (such as a painted surface), the light rays will the rays will reflect in different directions. إذا كان السطح خشنًا (مثل السطح المطلي)، فسوف تنعكس أشعة الضوء في اتجاهات مختلفة.



Why do you see your shadow?

Opaque objects (including the human body) always form shadows in the presence of light. Shadow happens because all the light that hits the body either bounces off or is absorbed.

How does light striking matter make it possible for humans and animals to see

1-When light waves strike an object, light reflects off (bounces off) this object.
2-The reflected light travels in a straight line into the eyes. Special nerves in the eyes send messages to the brain.
3-The brain interprets the messages as an image of this object.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Smooth Surface	سطح أملس	Rough surface	سطح خشن
Opaque	معتم	Shadow	ظل
smooth	أملسًا	rough	خشنًا
reflect	تنعكس	painted	المطلي
Opaque objects	اجسام معتمة	direction	اتجاه
Transparent objects	اجسام شفافة	allow light to pass	تسمح للضوء بالمرور
Shiny smooth	ناعم لامع		

Exercises on Lesson (2)

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1-Choose the correct answer?

1. Light travels in …….lines in the form of waves
   a. curved b. zigzag c. straight d. circular
2. When light rays hit an object, all the following sentences are correct, except
   a. some of this rays is absorbed by the object.
   b. some of this rays is bounced off the object.
   c. some of this rays may go through the object.
   d. some of this rays reflects to our ears causing hearing.
3. shadow of this object is formed because
   a. light can pass through the object. b. light cannot pass through the object
   c. this object is made of glass. d. this object is transparent.
4. Opaque material
   a. allows light to pass through. b. absorbs some of light that falls on it only.
   c. reflects some of light that falls on it only.
   d. absorbs some of light that falls on it and reflects the other.
5. All of the following are transparent objects, except
   a. glass. b. water. c. paper. d. air.
6. ……allows most of light to pass through, while.....don't
   a. Air-glass b. Glass-air c. Wood-glass d. Glass-wood
7. Mirror causes falling light rays to.....
   a. pass through it. b. reflect at the same angle they strick the mirror.
   c. reflect in different directions. d. diffuse like that of rough surfaces.
8. Our eyes,
   a. can see both through opaque and transparent objects.
   b. cannot see through both opaque and transparent objects.
   c. can see through opaque objects, but not through transparent objects.
   d. can see through transparent objects, but not through opaque objects.
9. If there are two sheets, one is made of wood and the other is made of glass,
   a. you can see the glass sheet through the wood sheet.
   b. you cannot see the wood sheet through the glass sheet.
   c you can see the wood sheet through the glass sheet.
   d. light can pass through both sheets
10. Light rays can pass through lenses, so they are made up of
   a. wood. b. sheets c. glass d. metal

2-Choose from column (A) what suits it in column (B) :

(A)	(B)
1. Mirror	a. It is a transparent piece that allows light to pass through.
2. Piece of cloth	b. It is considered as a source of light that exists in the sky.
3. Reflected light	c. It is a rough surface that scatters reflected light rays.
4. Lenses	d. It is the light that bounces of a reflecting surface.
	e. It is a smooth and shiny surface that reflects most of falling light.

1. …… 2. …… 3. …… 4. ……

3- Put (√) or (X):

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1. Transparent objects include mirrors and lenses. ( )
2. Rough objects tend to reflect light better than smooth objects. ( )
3. Both wooden piece and paper reflect incoming light rays at the same angle at which they struck them. ( )
4. Mirror reflects most of incoming light rays that fall on it. ( )
5. The light reflection depends on smoothness of the object's surface. ( )

4.Write the scientific term of each of the following:

1. Materials that allow light to pass through. (……..)
2. Materials that we cannot see through it. (……..)
3. A type of surface that reflects light in different directions. (……..)

5- Correct the underlined words:

1. We see the objects as a result of the absorption of light rays onto our eyes. (……..)
2. Opaque materials includes water, glass, air and lenses. (……..)
3. Rough objects reflect light rays in one direction at the same angle at which they struck the object (……..)

6-Complete the following sentences:

1. Light travels in ……..lines
2. Light and sound travel in the form of ……while objects that allow
3. Objects that light can't pass through are called …… while object that allow light to pass through are called……..
4. A tree forms a shadow as it is an…….. object that doesn't allow…….. to pass through
5. Cloth and paper are considered. …….surfaces that scatter or diffuse …… energy
6. Human body, wood and…….. are considered…….. materials which …….light to pass through.
7. Rough materials reflect light …….than smooth materials.
8. Things can be seen through…… objects such as…… and……

7- Give reasons for ::

1. Shadow of an opaque body is formed when light falls on it.

……

2. You can see an object placed behind a glass cup.

……

3. A mirror can reflect light better than a painted surface.

……

8-What happens if...?

1. You place an opaque object between a light source and a wall.

……

2. Light falls on a transparent body such as a glass window.

……

3. Light falls on a rough surface, according to the direction of the reflected li

……

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Lesson (3) Fireflies light show

Activity 6

Firefly Light Show عرض ضوء خنافس اليراعات

These lights are not produced by humans.
They are produced by thousands of small sects known as "fireflies beetles.

هذه الأضواء لا ينتجها البشر.يتم إنتاجها من قبل الآلاف من الطوائف الصغيرة المعروفة باسم "خنافس اليراعات

How do fireflies beetles produce the lights they use to communicate ?

Fireflies produce a chemical reaction inside their bodies that allows them to light up and communicate with other fireflies.

- كيف تنتج خنافس اليراعات الأضواء التي تستخدمها للتواصل؟

.تنتج اليراعات تفاعلًا كيميائيًا داخل أجسامها مما يسمح لها بالإضاءة والتواصل مع اليراعات الأخرى

► How do fireflies use their senses to communicate?

كيف تستخدم اليراعات حواسهم للتواصل؟

1. Fireflies use their wings to form different flash patterns to:
-Warn off other firefly beetles from predators.
-Attract a mate to reproduce.

.تحذير خنافس اليراع الأخرى من الحيوانات المفترسة- تستخدم اليراعات أجنحتها لتشكيل أنماط وميض مختلفة من أجل جذب للتكاثر

2. They flash at regular periods of time, but if there is another group of fireflies flashing nearby, they will change their own flash pattern to match the flash pattern of the other group to communicate.
Humans use lights to communicate with each other to transfer information such as using traffic lights.

تومض في فترات زمنية منتظمة ، ولكن إذا كانت هناك مجموعة أخرى من اليراعات تومض في مكان قريب ، فسيقومون بتغيير نمط الفلاش الخاص بهم لمطابقة نمط الفلاش الخاص بالمجموعة الأخرى للتواصل...

The different types of communication in humans, animals and both :

Humans	Animals
• Reading. • Writing.كتابة • . قراءة • Watching TV مشاهدة التلفزيون . • A cell phone.تيلفون An electronic reader device(e-reader). جهاز قارئ الكتروني (قارئ الكتروني)	Echolocation تحديد الموقع بالصدى

Both كلاهما

Producing sounds (high-pitched and law-pitched). • Displaying light.
.• إنتاج الأصوات (عالية النبرة ونبرة القانون). • عرض الضوء

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Exercises on Lesson (3)

1-Choose the correct answer?

1. A firefly is not a bird, but it is a type of

a amphibians. b. lizards c. beetles. d. reptiles

2. Which of the following is not a reason for fireflies to produce a flash light?

a To attract a mate b. For communication.

c. To warn off predators d. To hear in the dark

3. Changing the pattern of lighting up in a firefly is an example of adaptation(s).

a structural and behavioral b. physical and behavioral

c. only structural d. only behavioral

4. People can use the following ways to communicate, except

a. reading. b. writing. c. speaking d. flying.

5. The ability to communicate through language and speech separates …….. from animals.

a humans b. animals c. plants d. non-living things

6. Reading and writing are common types of communication in world.

a. humans b. animals c. birds d. plants

7. Displaying light is a type of communication that is found in both

a. plants and animals. b. plants and humans

c. animals and humans d. plants and non living things.

2-Choose from column (A) what suits it in column (B) :

(A)	(B)
1. Watching TV	a. is a type of communication in plants only
2. Echolocation	b. is a type of communication in animals only
3. Displaying light	c. is a type of communication in humans only.
	d. is a type of communication in both animals and humans.

1. ……. 2. ……. 3. …….

3- Put (√) or (X):

1. Fireflies produce flash lights to warn off predators. ( )
2. Fireflies are wingless beetles( )
3. Speaking is the only way to communicate with people. ( )
4. Echolocation is a type of communication between owls. ( )
5. Fireflies produce a chemical reaction inside their bodies that allows them to light up. ( )
6. A cell phone is a device that is used in communication between humans. ( )

4 Give reasons for:

1. Humans receive and send information through speaking, writing and reading.

……..

2. Fireflies use different patterns of flash lights to communicate with each other.

……..

3. Fireflies produce a chemical reaction inside their bodies.

……..

7 What happens if ... ?

1. A firefly wants to attract a mate to reproduce…….

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Lesson (4) Transferring Information

Transferring Information نقل المعلومات

-The senses can be used to communicate information as.

مثل المعلومات وتنقل الحواس تتواصل

Sense organs collect information about the world around us then send signals to the brain through nerves for processing and understanding.

Human senses are used to gather information from the environment and communicate with others, where:

1. Ears use sound energy to gather information from the environment .

الاذن تستخدم الطاقة الصوتية لجمع المعلومات من البيئة

2. Eyes use light energy to gather information and communicate with others

العيون.تستخدم الطاقة الضوئية لجمع المعلومات والتواصل مع الآخرين .2

Eyes can detect signals that travel very fast such as

العين يمكن ان تحدد الاشارة بشكل سريع مثل

1-When eye sees a red traffic light, it means you must to stop.

عندما ترى العين اشارة المرورترسل اشارة للتوقف

2-People use a rescue flare to get help.

الناس تستخدم شعلة إنقاذِ ضوئية لطلب المساعدة

3-People use signal fires to communicate over many kilometers

الناس تستخدم الشعلة النارية عبر الكيلومترات

4-Many hikers use mirrors to attract the attention of rescue of helicopters

يستخدم الرحالة المرايا للاضاءة لجذب النتباه الطائرة

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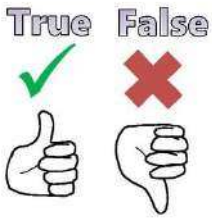
Codes and transferring information الشفرات لنقل المعلومات

Code: it is pattern has meaning الشفرة النمط له معنى :



1- Thumbs-up or thumbs-down and traffic lights can be used to express simple meanings like good, traffic light bad, stop and go.

يمكن استخدام رموز الإبهام لأعلى أو لأسفل وإشارات المرور للتعبير عن معاني بسيطة مثل الخير والشر والتوقف والانطلاق.

2- Expressions on faces are codes that can help people predict our feelings such as: Thinking- happy - sad - angry

التعابير الموجودة على الوجوه هي رموز يمكن :التفكير ، السعادة ، الحزن ، الغضب أن تساعد الناس على التنبؤ بمشاعرنا مثل

3. Language: is a code in the form of sounds, where different languages are different codes that are used to transfer information. . اللغة هو رمز على شكل أصوات ، حيث اللغات المختلفة هي رموز مختلفة تستخدم لنقل المعلومات.

4. Writing: is a code that uses symbols in a pattern to give a specific meaning according to the arrangement of letters in a word.

الكتابة هو رمز يستخدم رموزًا في نمط ما لإعطاء معنى محدد وفقًا لترتيب الحروف في الكلمة

5. Music or Sounds that produced from humans, musical instruments, can be used in communication .

الموسيقي والاصوات الناتجة من الانسان او الالات الموسيقية يمكن ان تستخدم للتوصل

6-Lighthouses send codes in the form of flashes of light that tell sailors where they are.

المنارات ترسل رموزًا على شكل ومضات من الضوء تخبر البحارة عن مكانهم.

When sense organs receive this information and send messages to the brain, the brain decodes and interprets the meaning.

وعندما تتلقى أعضاء الحس هذه المعلومات وترسل رسائل إلى الدماغ، يقوم الدماغ بفك تشفير المعنى وتفسيره

.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Transferring	نقل	Code	الشفرة
Information	المعلومات	Thumbs-up	الإبهام لأعلى
senses	الحواس	thumbs-down	الإبهام لأسفل
communicate	التواصل	Expressions	التعابير
fast	سريع	happy	السعادة
gather	تجمع	Thinking	التفكير
environment	البيئة	express	للتعبير
Ears	الاذن	sad	الحزن
Eyes	العين	feelings	المشاعر
red traffic	اشارة المرورحمراء	Lighthouses	المنارات
rescue	ينقذ	Language	اللغة
Writing	الكتابة	pattern	نمط

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Exercises on Lesson (2)

1-Choose the correct answer?

1. All of the following are forms of codes, except
   a. thumb up and down hands. b. faces expressions.
   c. writing. d. swimming.
2. When your eyes see a red traffic light, they send a signal to you to
   a. increase your speed b. decrease your speed..
   c. keep your speed as it is. d. stop at once
3. People use a rescue flare to communicate with each other depending on the sense of
   a hearing. b. sight. c. smell. d. touch.
4. Sense organs collect information and send signals to…… for processing and understanding
   a. hands b. legs c. brain d. stomach
5. All the following signals are information that the eyes receive, except
   a. green traffic light. b. fire alarm.
   c. signal fires d. rescue flare.

2-Choose from column (A) what suits it in column (B) :

(A)	(B)
1. Thumb-up	a. is a code that means that you are in a danger
2. Thumb-down	b. is a code that means that you say "Yes".
	c. is a code that means that you say "No".

1. …… 2. ……

3- Put (√) or (X):

1. Animals communicate with each other by using different senses. ( )
2. Sense organs can decode the information that is sent by the brain. ( )
3. Expressions on faces are codes that can help people predict our feelings ( )
4. Different languages have similar codes. ( )
5. People use signal fires to communicate over distances of many kilometers. ( )

4 Write the scientific term of each of the following:

1. Sense organ that can detect sound energy. (……....).
2. Sense organ that can detect light energy. (……....).
3. It send flash code that tell sailors where they are (……..).

5. Give reasons for:

1. The symbols that are used in writing have a specific pattern

……

2. People use face expressions during talking with each other.

……

6 What happens if... ?

-The traffic light becomes red while you are going to cross the road.

……

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Unit (2) Motion

Lesson (1) Starting and stopping

Starting and stopping

1- The objects require a force to stop or move .

الأجسام تحتاج قوة للتَوَقُّف أو للحرّكة

2-This force could be a pushing force or pulling force.

هذه القوة يُمكنُ أنْ تَكُونَ قوةَ دفع أو قوة سحبً

3- The person in picture (1) needs energy to push the car

الشخص في الصورةِ (1) يَحتاجُ الطاقةَ لدَفْع السيارةِ

4- The person in picture (2) needs energy to pull the car.

الشخص في الصورةِ (2) يَحتاجُ الطاقةَ لسَحْب العربة

5- The football player in (3) needs energy to push the ball.

لاعب كرةَ القدم في الصورةِ (3) يَحتاجُ الطاقةَ لدَفْع الكرةِ

6-The goalkeeper needs energy to push against the ball to stop it.

يحتاجُ حارس المرمى طاقةً للاندفَاع ضدّ الكرةِ وايقافها

Truck versus airplane الشاحنة مقابل الطائرة

The engines on a jet airplane are much more powerful than the engine in a truck So, jet airplanes fly much faster than moving trucks .

محرّكِ الطائرات النفّاثةَ اقويَّ كثير جدا مِنْ محرّكِ الشاحنة لذا تطير الطائرات النفاثة اسرع بكثير من الشاحنات

-This truck in is known as the shockwave truck

Which has been fitted with three jet engines.

هذة الشاحنةَ تعرف ب شاحنة موجةِ إهتزاز "وهى مجُهّزَ بثلاثة محركات نفّاثةِ.

-Due to these three jet engines , the shockwave truck can reach speeds of more than 500 kilometers an hour , بسبب

هذه المحركات النفّاثةِ الثلاثة، شاحنةَ موجةَ الإهتزاز يُمْكِنُ أَنْ تَصلَ سرعتها ً لأكثر مِنْ 500 كيلومتر في السّاعة

which means that it is about five times faster than the normal trucks.

، اى أنّها حوالي خمس مراتِ أسرعِ مِنْ الشاحناتِ العادية

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How does the Shockwave stop

To stop the Shockwave, engineer install three parachutes in it, that the driver opens them to help slow down the Shockwave quickly

The idea of parachutes is used in rocket designs -

لإيقاف ، قام المهندس بتثبيت ثلاث مظلات فيها ، بحيث يفتحها السائق للمساعدة في إبطاء الشاحنة بسرعة

- تستخدم فكرة المظلات في تصميمات الصواريخ

Making Things Move لكى تتحرك الاشياء

All objects around us cannot move without push and pull forces, where

جميع الكائنات من حولنا لا يمكن التحرك بدون قوى الدفع والسحب ، حيث

A ball lying on the ground does not move until someone pushes it with his foot to make the ball roll.

كرة موضوعة على الأرض لا تتحرك حتى يدفعها شخص ما بقدمه لصنع الكرة

A closed drawer doesn't open until someone pulls the handle with his hand to open the drawer

درج مغلق لا يفتح حتى يسحب شخص ما المقبض بيده لفتح الدرج

Air force: القوة الهواء

can provide enough force to move some objects such as:

The wind blowing that can move the leaves of a tree.

يمكن أن توفر قوة كافية لتحريك بعض الأشياء مثل: هبوب الرياح التي يمكنها تحريك أوراق الشجرة

Let's see how engineers prove that the force of air can move some objects like "a cart".

دعونا نرى كيف يثبت المهندسون أن قوة الهواء يمكن أن تحرك بعض الأشياء مثل

A cart with fire extinguishers

Some engineers fix fire extinguishers onto a cart.

يقوم بعض المهندسين بتثبيت طفايات الحريق على عربة :.

When they release air from the fire extinguishers, the air moves backward that makes the cart begins to move forward.

عندما يطلقون الهواء من طفايات الحريق ، يتحرك الهواء للخلف مما يجعل العربة تتحرك للأمام.

By increasing the number of fire extinguishers. the speed of the cart increases and the distance that it moves increases too and vice versa.

عن طريق زيادة عدد طفايات الحريق. تزداد سرعة العربة وتزداد المسافة التي تقطعها أيضًا والعكس صحيح

.

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
require	تحتاج	objects	الأجسام
pushing	قوةً دفع	force	قوة
pulling	قوة سحبً	Truck	شاحنة
versus	مقابل	airplane	الطائرة
shockwave truck	شاحنة موجةِ إهتزاز	speeds	سرعتها
jet engines.	محركات نفّاثةِ	five times faster	أسرعِ خمس مراتِ
parachutes	مظلات	driver	السائق
slow down	إبطاء	rocket	الصاروخ
idea	فكرة	Air force:	قوة الهواء
designs	تصميمات	fire extinguishers	طفايات الحريق
Increase	تزداد	Decrease	تقل

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Unit (2)Exercises on Lesson (1)

1-Choose the correct answer?

1. Push or pull actions are considered as types of
a. force b. device c. energy d. adaptation

2-When you kick a ball, it moves due to the effect of
a. pulling force only b. pushing force only
c. pushing and pulling forces d. sound energy only

3.When you move something away from you, this represents pushing force
a pushing force b. light energy. c pulling force d. sound energy

4. When you move something toward you, this represents
a pushing force b. light energy. c pulling force d. sound energy

5-The speed of a normal truck is more than that of
a. a jet airplane only. b. a jet airplane and a rocket
c. a rocket and a bicycle d. a bicycle only

6-Parachutes are used in the Shockwave truck to
a increase its speed b. decrease its speed
c. keep its speed as it is d. change its direction

7- In the Shockwave truck the three jet engines
a. don't affect its speed b. decrease its speed
c: stop its motion d. increase its speed

8-By increasing the number of fire extinguishers fixed to a cart, its speed ……..
a. increases b. decreases c. doesn't change d. becomes zero

9-All the following motions occur by the effect of pulling force, except
a. kicking a ball b. opening a closed drawer
c. wearing your socks d. lifting up a bag from the ground

10-The ……of the air that comes out of fire extinguishers causes the movement of a cart forward
a pulling force b. light energy c. pushing force d. sound energy

2-Put (√) or (x)

1. To open or close a door, we have to push or pull it. ( )
2. Putting on a pair of socks needs a pushing force. ( )
3-You need energy to push a car forward or backward ( )
4.A car can move faster than a bicycle ( ) .
5. A normal truck can move faster than a jet airplane ( )
6.The three jet engines in the Shockwave truck allow to fly .( )
7.A normal truck is slower than the Shockwave truck ( )
8.Parachutes are used to slow down the speed of the Shockwave truck quickly ( )
9. When the air is released backward from the fire extinguishers fixed to a cart .the cart moves backward ( )
10. By decreasing the number of fire extinguishers fixed to a cart, the speed of the cart increases ( )
11. Using a remote control of a television needs a pushing force to act on its buttons ( )
12. By increasing the speed of a moving cart, the distance that it moves will decrease ( )

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3-Write the scientific term of each of the following

1. A force that you make to move an object towards you (…….)
2. A force that you make to move an object away from you. (…….) .
3. One of the fastest and most powerful trucks in the world (…….)

4. Give reasons for

1. The shockwave truck is faster than the normal truck .

……

2. Engineers use parachutes in the shockwave truck designs……

……

3.When you kick a ball laying on the ground, it moves 3

……

5.What happens if

You kick a stopped ball on the ground .

……

2.Engineers placed jet engines inside a normal truck instead of its normal engine .

……

3.The Shockwave driver opens the parachutes.

……

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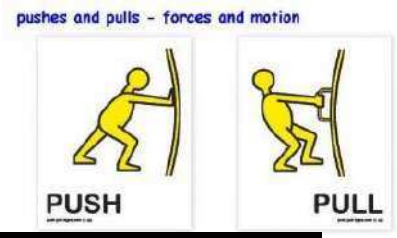
Lesson (2) Making Things Move

Making Things Move لكى تتحرك الاشياء



-All objects around us cannot move without push or pull forces.

كل الأشياء حولنا لا تستطيعُ التَحَرُّك بدون قوة سحبٍ او دفعٍ

Pushing force القوة الدفع	Pulling force القوة السحب
A man pushes a car. رجل يدفع عربة. 	A child pulls a toy car. طفل يسحب سيارة لعبة.

Balanced and unbalanced forces القوة المتزنة وغير المتزنة

Balanced force القوة المتزنة	UnBalanced force القوة غير المتزنة
If there are balanced forces act on an object, so this object will not move إذا كانت هناك قوى متوازنة تعمل على جسم ما ، لذلك لن يتحرك هذا الكائن. Example: مثال In the tug-of-war game, if the two teams are pulling the rope with equal forces. This means that, the forces that act on rope are balanced (equal) forces. -So, the rope will not move. في لعبة شد الحبل ، إذا كان الفريقان يسحبان الحبل بقوى متساوية. على الحبل قوى متوازنة (متساوية) لذا الحبل لن يتحرك -	If there are unbalanced forces act on an object, so this object will move. إذا كانت هناك قوى غير متوازنة تعمل على جسم ما ، لذلك هذا الكائن سوف يتحرك. Example: مثال: - In the tug-of-war game, if one team is pulling the rope with a greater force. - This means that, the forces that act on the rope are unbalanced (unequal) forces. So, the rope will move toward the team with the greater force. - في لعبة شد الحبل ، إذا كان أحد الفريقين يسحب الحبل بقوة أكبر. - هذا يعني ، القوى التي تعمل على الحبل هي قوى غير متوازنة (غير متكافئة). إذن ، سيتحرك الحبل تجاه الفريق بقوة أكبر

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Activity 5 Objects in Motion

How do we know an object is moving? كيف نعرف أن الجسم يتحرك؟

An object is in motion if its position changes from one place to another, even if this change can't be seen

جسم ما في حالة حركة إذا تغير موضعه من مكان إلى آخر ، حتى إذا كان هذا التغيير لا يمكن رؤيته

The change in position of an object is compared to something else that is not usually moving (fixed point)

تتم مقارنة التغيير في موضع كائن بشيء آخر لا يتحرك عادةً (نقطة ثابتة)

Motion: It is any change in the position of an object relative to a fixed starting point

الحركة هو أي تغيير في موضع كائن ما بالنسبة إلى نقطة بداية ثابتة

Example of an object motion:

مثال على حركة جسم

-The boy holding a ball in starting position which is close to the tree.

الصبي يحمل كرة في وضع البداية القريب من الشجرة

-When he throws the ball, it will move by the pushing force through the air

عندما يرمي الكرة ، ستتحرك بقوة الدفع عبر الهواء

-Then the ball will drop into the hand of the girl by pulling force of gravity.

ثم ستسقط الكرة في يد الفتاة بسحب قوة الجاذبية.

Gravity: الجاذبية

It is the force that pulls objects down toward the Earth.

إنها القوة التي تسحب الأشياء نحو الأرض.

- The ball will stop by the pushing force of the hand of the girl against the ball movement.

-The position of the ball changes, relative to the tree which is the fixed starting point.

- ستتوقف الكرة بقوة دفع يد الفتاة تجاه حركة الكرة.

- يتغير موضع الكرة بالنسبة إلى الشجرة التي تمثل نقطة البداية الثابتة.

Some motion is easy to see بَعْض الحركةِ سهلةُ الرُؤية مثل	-Some motion is hard to see بَعْض الحركةِ صعبة الرُؤية مثل
Such as - A person walk شخص يمشي- ورقة. -A leaf blowing in the wind. ورقة تسير في الهواء	Such as -The rotation of Earth around the Sun. دوران الارض حول الشمس

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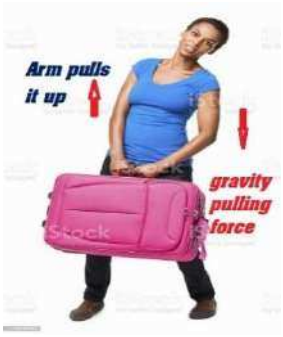
Force : It is a push or pull that is applied to an object causes it to change its position. القوة: هي دفع أو سحب يتم تطبيقه على جسم ما يؤدي إلى تغيير موضعه .

What are the forces that affect the bag when you lift it?

ما هي القوى التي تؤثر على حقيبتك عند رفعه؟



-The force of the gravity pulls your bag downward.

-The force of your arm pulls your bag upward.

- قوة الجاذبية تسحب حقيبتك إلى أسفل. - قوة ذراعك تسحب حقيبتك لأعلى.

-The pulling force of your arm is greater than the pulling force of the gravity (two unbalanced forces). - قوة شد ذراعك أكبر من قوة سحب الجاذبية (قوتان غير متوازنتين).

So, the bag moves up toward the greater force.

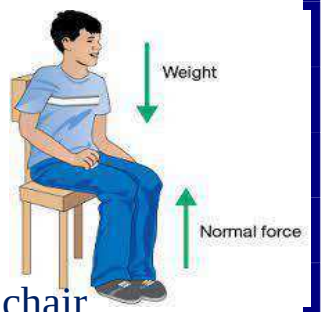
لذا ، يتحرك الحقيبة لأعلى باتجاه القوة الأكبر

To move up any object from the ground, the pulling force of your arm must be greater than the pulling force of the gravity

لبرفع اى جسم من الأرض ، يجب أن تكون قوة سحب ذراعك أكبر من قوة سحب الجاذبية .

Is there any force affects objects when they are not in motion?

هل هناك أي قوة تؤثر على الأشياء عندما لا تكون في حالة حركة؟



1- When you sit on a chair:

the force of the gravity pulls you downward.

عندما تجلس على كرسي قوة الجاذبية تدفعك إلى أسفل.

- The chair exerts force that pushes your body upward

يعمل الكرسي القوة التي تدفع جسمك لأعلى

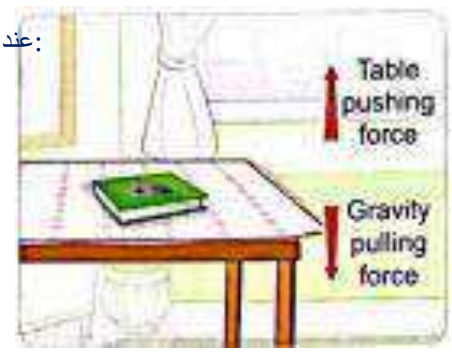
- The force of the gravity is equal to the pushing force of the chair (two balanced forces).

- قوة الجاذبية تساوي قوة دفع الكرسي (قوتان متوازنتان).

So there is no motion due to the two balanced forces that hold you in the chair

لذلك لا توجد حركة بسبب القوتين المتوازنتين اللتين تحملك على الكرسي

2. When a book is put on a table: . عند وضع كتاب على منضدة:



-The force of the gravity pulls the book downward - The table exerts force that pushes the book upward,

- قوة الجاذبية تسحب الكتاب إلى أسفل - تمارس الطاولة القوة التي تدفع الكتاب لأعلى ، -

The pulling force of the gravity is equal to the pushing force of the table (two balanced forces)

قوة سحب الجاذبية تساوي قوة دفع الطاولة (قوتان متوازنتان)

So, there is no motion due to the two balanced forces that affect the book

إذن ، لا توجد حركة بسبب القوتين المتوازنتين اللتين تؤثران على الكتاب

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
Balanced force	القوة المتزنة	Un-Balanced force	االقوة غير المتزنة
tug-of-war game,	لعبة شد الحبل	change in position	التغيير في موضع
Unequal forces	قوة غير متساوية	equal forces	قوة متساوية
gravity	الجاذبية	Motion:	الحركة
easy to see	سهلةُ الرُؤية	hard to see	صعبة الرُؤية
downward	أسفل	upward	لأعلى
affects	تؤثر	two balanced forces	قوتان متوازنتان
chair	الكرسي	table	منضدة

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Exercises on Lesson (2)

1-Choose the correct answer?

1-All objects around us can move by the effect of
a. pushing forces only b. pulling for only
c. pushing and pulling forces d. sound and light energies

2-A ball may move away from the foot of a football player by the effect of
a. pushing forces only b. pulling for only
c. pushing and pulling forces d. sound energy only

3-When an object is in motion, this means that its ……..changes
a. color b. shape c. size d. position

4. When you sit on a chair, the force of gravity is …….. and holding you in the chair
a. pulling you upward b. pulling you downward
c. pushing you upward d. pushing you downward

5.What makes a ball in the air fall down to the ground
a. Friction force b. Gravity force c. Sound energy d. Light energy

6.Which of the following will cause an object to move
a. Balanced forces b. Unbalanced forces c. Sound energy d. Light energy

7.In the tug-of-war game, two teams .
a. pull the rope in the same direction b. push the rope in the same direction
c. pull the rope in opposite directions d. push the rope in opposite directions

8-In the tug-of-war game, when two teams are pulling a rope, and the rope does not move toward any team, this means that
a. Equal forces are being applied on the rope in the same direction
b. Equal forces are being applied on the rope in opposite directions
c. Unequal forces are being applied on the rope in the same direction
d. Unequal forces are being applied on the rope in opposite directions

9. Which of the following is an example of unbalanced forces?
a. Two children push a box with the same force in opposite directions
b. Two children play on a seesaw without its moving up or down
c. Two children play on a seesaw, that moves up and down.
d. Two teams play the tug-of-war game while the rope doesn't move

10. All of the following are examples of motion, except
a. a running person b. a ball travelling through the air
c. a flying bird d. a sleeping dog

11. Two equal forces act at the same time on a stopping object but in opposite directions. Which sentence describes the object's state
a. The object stays in its place without moving. b. The object speed decreases.
c. The object speed doesn't change d. The object speed increases.

12. You can see the movement of the following objects, except the movement of
a. a flying airplane b. a running horse. c. sea waves d. the planet Earth

13. Gravity is a force that
a. pushes objects down toward the Earth. b. pulls objects down toward the Earth.
c. pushes objects toward the sky d. pulls objects toward the sky.

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2-Put (√) or (x)

1. The stopping object can't move until a force acts on it ( )
2. The rotation of the Earth around the Sun is easy to be seen. ( )
3. Unbalanced forces keep an object in its place without moving ( )
4. if the two teams in the tug-of-war game are pulling the rope with equal fore the rope will move toward one of the two teams ( )
5. Unbalanced forces cause a change in the object position ( )
6. If one team in the tug-of-war game pulls the rope with a greater force the rope will move toward the team with the smaller force ( )

4. Write the scientific term of each of the following

1. It is a push its position or pull is applied to an object causes it to change its position (……)
2. The force you can do to move an object away from you (……)
3 The force you can do to tiring an object closer to you (……)
4.A change in the position of an object relative to a fixed starting point (……)
5. The force that pulls objects down toward the Earth (……)

3. Correct the underlined words:

1. Moving an object away from you represents a pulling force(……)
2. Moving an object toward you represents a pushing force (……)
3. The balanced forces cause the object to move (……)
4. When you jump up, the force of friction pulls you back to the ground. (……)
5.Changing the position of an object relative to a fixed point is known as force(……)
6.The rope in the tug-of-war game may not move toward any team, if both teams push with the same force(……)

4.Give reasons for

1-When two que pushing forces act on an object in opposite directions, Object doesn't move

……

2. you let a pen out of your hand, it falls to the ground

……

3. When your friend catches a ball that is thrown in the air, the motion of the ball stopped

……

5.What happens if ?

1. The pulling forces of the two teams are equal in the tug-of-war game

……

2. You let your toy out of your hand

……

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Lesson (3) Stopping Motion

Activity 7 Stopping Motion

How does an object in motion stop? كيف يتوقف جسم متحرك؟

A moving object only stops when a force of the same amount is applied to it in the opposite direction of its motion.

يتوقف الجسم فقط المتحرك إلا عندما يتم تطبيق قوة من نفس المقدار عليه في الاتجاه المعاكس لحركته.

The force that stops a moving object may be:

قد تكون القوة التي توقف الجسم المتحرك:

Easy to be observe من السهل ملاحظتها	Hard to be observed يصعب ملاحظتها
Example مثال -When a car crashes into a wall, it will stop. - عندما تصطدم سيارة بالحائط ، ستتوقف. • Because the wall applied لأن الجدار يعمل a force to the car with the sam amount of the force that pushe the car toward the wall. قوة على السيارة بنفس القدر من القوة التي تدفع السيارة نحو الحائط.	Exampleمثال When a car runs out of fuel on a fast road is speed decreases gradually until it stops عندما ينفد الوقود من السيارة على طريق سريع ، تنخفض السرعة تدريجيًا حتى تتوقف Because there is a friction force comes from لأن هناك قوة احتكاك تأتي من 1. Friction (rub) between the car tires and the road.1. الاحتكاك (الاحتكاك) بين إطارات السيارة والطريق . 2. Friction between the air that flows over the c against its surface 2 . الاحتكاك بين الهواء الذي يتدفق فوق السيارة على سطحها

Friction It is a force that is exerted when objects rub against each other.

الاحتكاك هو القوة التي تمارس عندما تحتك الأشياء ببعضها البعض.

1.Friction force always slows down or stops motion of moving objects.

2. The direction of friction force is always opposite to the direction of motion of a moving object.

1. تبطئ قوة الاحتكاك دائمًا أو توقف حركة الأجسام المتحركة.
2. يكون اتجاه قوة الاحتكاك دائمًا عكس اتجاه حركة الجسم المتحرك.

Activity 10 Rolling Car

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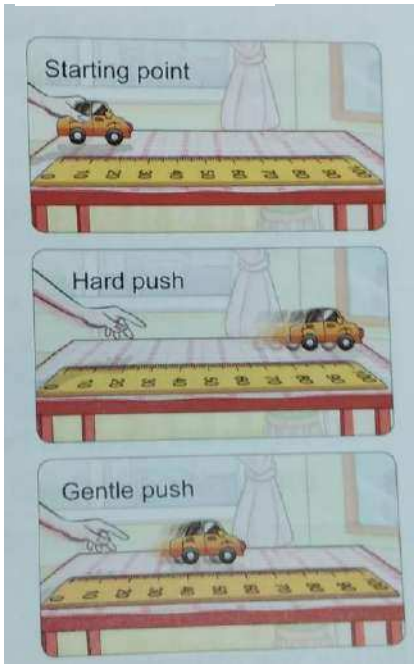
Tools

Toy car

Measuring ruler

Steps

1. Push a toy car hard from a starting point.
2. Record the distance the toy car rolls by using the measuring tape. Hard push
3. Repeat step (1) and (2) several times, and record the data in a table, then find the average distance.
4. Push a toy car very gently from the same starting point.
5. Record the distance the toy car rolls. Gentle push
6. Repeat step (4) and (5) several times, and record the data in another table, then find the average distance. the amount of force that acts on an object and the distance covered



.ادفع سيارة لعبة بقوة من نقطة البداية . سجل المسافة التي تلتف عليها سيارة اللعبة باستخدام شريط القياس. دفع صعب .
.كرر الخطوتين (1) و (2) عدة مرات ، وقم بتسجيل البيانات في جدول ، ثم ابحث عن متوسط المسافة 3.
.ادفع سيارة لعبة بلطف شديد من نفس نقطة البداية . سجل المسافة التي تلتف حولها سيارة اللعبة. دفعة لطيف .
كرر الخطوتين (4) و (5) عدة مرات ، وقم بتسجيل البيانات في جدول آخر ، ثم ابحث عن متوسط المسافة. مقدار القوة التي تؤثر على جسم .
والمسافة المقطوعة

Observations • The car moves a large distance when it is pushed hard as shown in the following table: $=\frac{90+75+80+95}{4}$ =85

• The car moves a small distance when it is pushed gently as shown the following table = $\frac{14+17+30+17}{4}$=17

:ملاحظات • تتحرك السيارة لمسافة كبيرة عند دفعها بقوة كما هو موضح في التالي
:تحرك السيارة مسافة صغيرة عند دفعها برفق كما هو موضح في التالي •

> Conclusions • Hard push causes object to travel a long distance.

الاستنتاجات • الدفع الشديد يتسبب في انتقال الجسم لمسافة طويلة

• Gentle push causes object to travel a small distance.

. • يؤدي الدفع اللطيف إلى انتقال الجسم لمسافة صغيرة

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Dictionary قاموس

الكلمة	معناها	الكلمة	معناها
motion	الحركه	moving object	الجسم المتحرك
applied	تطبيق	stops	يتوقف
opposite	المعاكس	gradually	تدريجيًا
Friction	الاحتكاك	against	ضد
exerted	تبذل	measuring tape. .	شريط القياس
Hard push	دفع صعب	Gentle push	الدفع اللطيف
long distance.	لمسافة طويلة	small distance	لمسافة صغيرة
several times	عدة مرات	large distance	مسافة كبيرة

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Exercises on Lesson (3)

1-Choose the correct answer?

1.The fore that occurs when an objects against another object
a. fiction b. gravity c. push d. pull

2.The force that tries an object moving on a surface is called
a. gravity b. fiction c. push d. pull

3.There is a ……force between the car tires and the road that acts to decrease car's speed gradually
a. gravity b. pulling c. pushing d. fiction

4.Which of the following sentences describes the friction force
a. It pulls objects toward the ground b. It pushes objects away from the ground
c. It slows down or stops objects in motion d. It doesn't affect objects in motion

5.When an apple falls from a tree down to the ground, it is affected by
a. friction force of air only b. gravity pulling force only
c. gravity pushing force only d. friction of air and gravity pulling forces

6. Tamer pushes a ball on a flat ground and it covers a distance of 30 cm. If he pushes it with more force, it may cover a distance equal to…… cm
a. 5 b. 15 c. 30 d. 50

2-Put (√) or (x)

1.When a car crashes into a wall, it will not stop ( )
2.Sometimes is easy to observe the force that stops an object ( )
3.When a car runs out of fuel on a flat road, its speed increases gradually until stop ( )
4.Friction force always slows down or stops the motion of moving objects ( )
5. The motion of an object on the ground is affected by a friction force ( )
6. Hard push causes an object to travel for a longer distance. ( ) ( )
7.If the same force acts on two different objects so, the bigger object will travel for a longer distance
8.A football rolls on the ground to a distance then it stops the force which stop the ball is the gravity force ( )

3. Correct the underlined words:

1. 1. Moving object stops when a force of the same amount is applied to it in the same .direction of its motion(……)
2.If a car runs out of fuel, its speed increases. (……)
3. The motion of a car is opposed by the gravity of air (……)

4. Write the scientific term of each of the following

1. It is a force that is exerted when objects rub against each other. (……)
2. It is a force that slows down the motion of moving objects (……)

5. Give reasons for

1. When your toy car crashes into a wall, it will stop moving
2.When you stop pedaling during the movement of your bicycle, it slows down until it stops .
3.If you push two similar toy cars on the same ground, one of them may travel for a longer .distance than the other
4.If the same force acts on a small car and a truck, the small car will travel for a longer . distance than the truc

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Concept (2.2) Lesson(1)

Energy and Motion
Roller Coasters

Activity 2 Roller Coasters قطار الملاهي

Al moving objects have a type of energy known as kinetic energy

To know the source of energy that makes the train move with this speed, read the following steps:

1. At the beginning of the roller coaster, there are electric motors that work by electricity, these motors are used to carry the train cars up to the top of the hill.

1. في بداية قطار الملاهي توجد محركات كهربائية تعمل بالكهرباء ، وتستخدم هذه المحركات لنقل عربات القطار إلى أعلى التل.

2. When the roller coaster reaches the highest point of the hill, the cars of the train actually store some energy during their rising to the top of the hill(Potential

2. عندما تصل قطار الملاهي إلى أعلى نقطة في التل ، تخزن عربات القطار فعليًا بعض الطاقة أثناء صعودها إلى قمة التل.

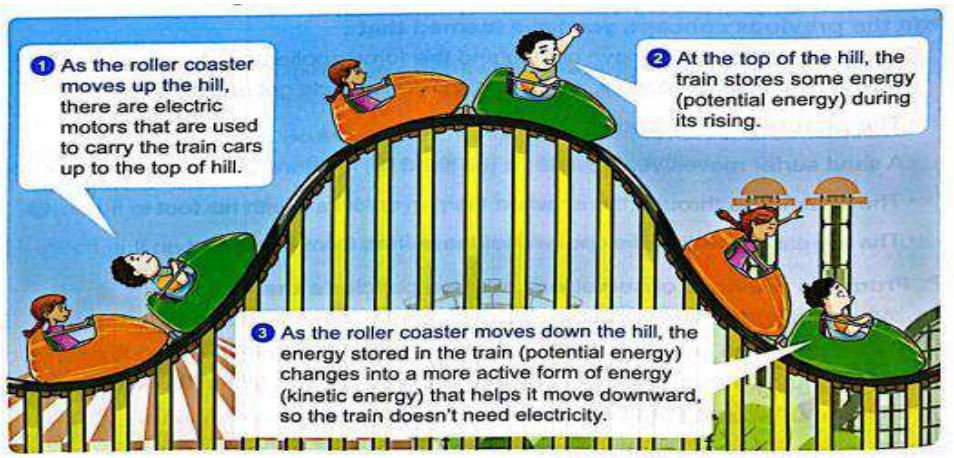
3. As the roller coaster moves down the hill, the energy stored in the train changes into a more active form of energy which is kinetic energy that helps it moves downward, so the train doesn't need electricity. While the roller coaster races down the hill, the energy increases as its speed

3. عندما تتحرك قطار الملاهي إلى أسفل التل ، تتغير الطاقة المخزنة في القطار إلى شكل أكثر نشاطًا من الطاقة وهي طاقة حركية تساعدها على التحرك إلى أسفل ، وبالتالي لا يحتاج القطار إلى الكهرباء. بينما تندفع الأفعوانية إلى أسفل التل ، تزداد الطاقة كلما زادت سرعتها

Conclusion: When the coaster moves downward, its kinetic energy increases.

• The kinetic energy increases as the speed increases.

الخلاصة: • عندما تتحرك قطار الملاهي نحو الأسفل ، تزداد طاقتها الحركية. • تزداد الطاقة الحركية مع زيادة السرعة.



What happens if ? • A roller coaster moves from up to down. (its energy).

The stored potential energy in the train is changed into kinetic energy.

• A roller coaster stops. (according to its kinetic energy).

Its kinetic energy becomes zero.

ماذا يحدث إذا ؟ • قطار الملاهي تتحرك من أعلى إلى أسفل (طاقتها) يتم تغيير الطاقة الكامنة المخزنة في القطار إلى طاقة حركية

• تتوقف قطار الملاهي. (حسب طاقتها الحركية) طاقتها الحركية تصبح صفرا..

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Activity 3 Energy and motion

Examples show the importance of energy in our life:

1-We eat food to obtain energy to help us grow and move.

1- نأكل الطعام للحصول على الطاقة التي تساعدنا على النمو والحركة.

2-Energy affect and changes and makes them move and change their places.

2- تؤثر الطاقة وتغيرها وتجعلها تتحرك وتغير أماكنها.

3.Energy helps in operating all electric devices.

3. تساعد الطاقة في تشغيل جميع الأجهزة الكهربائية.

4) Energy helps in cooking.

4) الطاقة تساعد في الطبخ.

5 Energy helps in lighting houses and streets.

5 تساعد الطاقة في إنارة المنازل والشوارع ـ.

Moving Energy

Energy moves (transfers from an object to another

example that Shows a player kicks a bail as shown in the following steps:

1-The kinetic energy transfers from the player's foot to the ball when he kicks it 1- تنتقل الطاقة الحركية من قدم اللاعب الكرة عندما يركلها-

2. Then, the ball moves in the air as a result of the transfe of kinetic energy to it.. 2 .ثم تتحرك الكرة في الهواء نتيجة انتقال الطاقة الحركية إليها

3. Then, the kinetic energy transfers from the ball to the goal net which vibrates as a result of the transfer of kinetic energy to it

.3ثم تنتقل الطاقة الحركية من الكرة إلى شبكة المرمى التى تهتز نتيجة انتقال الطاقة الحركية إليها .

Any stopped object on the Earth's surface as in figure (1) has no energy.

Any object at a height from the Earth's surface as in figure (2) has a special type of energy known as potential energy

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Concept (2.2)

Exercises on Lesson (1)

1-Choose the correct answer?

1.When a sand surfer moves down the hill, this means that he has……due to his movement

a. kinetic energy b. stored light energy c. potential energy d. stored electric energy

2. Human needs…….. to walk from one place to another

a light energy b. energy obtained from food

c. sound energy d. energy obtained from batter

3.Electric motor in the roller coaster helps it to

a move up to the top of the hill b. move down to the bottom of the hill.

c. stop at the top of the hill d. stop at the bottom of the hill

4.When an object moves down a ramp, its stored potential energy energy

a. increases. b. doesn't change

c. changes to a less active form of energy d. changes to a more active form of energy

5.When the roller coaster goes up, its speed .

a. decreases as it goes down

b. decreases as it reaches the top of the hill

c. is more than its speed when it goes down

d. increases as it reaches the top of the hill

6.When wheelchair and a car go up a ramp, which of them can store some…….

.a. The wheelchair only b. The car only

c. Both of them d. None of them

7.The roller coaster has the most energy of motion ……

a. as it goes up to the top of the hill b. as it goes down the hill

c. when it stops at the top of the hill. d. when it stops at the bottom of the hill

8.When the roller coaster stops, its energy of motion

a. doesn't change b. increases c. decreases d. becomes zero

9.When a car moves up a ramp, this happens due to the effect of……

a. gravity force. b. balanced force c. kinetic energy d. sound energy.

10. The type of energy that allows objects to move is known as…..

a. light energy . b. potential energy c. solar energy. d. kinetic energy .

2.Choose from column (B) what suits it in column (A)

(A)	(B)
1-When a wheelchair goes down a ramp	a it is under the effect of balanced force, and doesn't store energy
2. When a wheelchair stops at the top of a ramp	b. it has only energy of motion
3.When a wheelchair stops at the bottom of a ramp	c. it is under the effect of unbalanced force, where it loses its stored energy
	d. it is under the effect of balanced force, and it stores energy

1…….. 2…….. 3……

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3- Put (√) or (X):

1. We eat food to obtain energy ( )
1. Energy doesn't transfer from an object to another ( )
3 When a stopped object is affected by two opposite equal forces, it will not move ( )
4. if a wheelchair moves horizontally on the ground, its energy of motion equal zero ( )
5. The moving object only have energy, while the objects that don't move have no energy( )

4.Write the scientific term of each of the following:

1. The form of energy that the object has due to its movement (…….)
2. The form of energy that increases when the speed of an object increases.. (…….)

5.Correct the underlined words

1. When a roller coaster moves down a ramp, its kinetic energy doesn't change(…….)
2.If you push a pencil upward, it stops at a certain height then falls down due to the effect of pushing force of gravity(…….)
3. When an object moves down, it has more active form of energy known as potential energy(…….)
4. Under the effect of pushing force of gravity, anything falls down to the ground(…….)
5.Balanced forces cause stopped objects to move (…….)
6. our potential energy is transferred from your foot to a ball when you kick it(……..….)

6.Complete the following sentences:

1. When the roller coaster starts to move, it gets energy from…….. found in its first car which is operated by……..
2. The speed of a roller coaster when it moves toward the top of the hill is …….. than that when it moves down the hill
3. If the speed of an object decreases this means that as kinetic energy .
4. When the roller coaster moves up to the top of the hill…….. and……. energies cause its motion
5.When you kick a ball, the ……..energy of your foot transfers to it. So it moves through the air

7.Give reasons for

1. The roller coaster doesn't need electricity during its movement down the hull

……

2. The speed of the roller coaster increases as it moves down the hill

……

3.The goal net vibrates when a ball hits it

……

8. What happens if……?

1. the energy of Roller coaster moves down the hill

……

2. The roller coaster loses its kinetic energy .

……

3. the energy of stopped ball at the top of a ramp starts to move down.

……

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Lesson (2)

Energy basics

Activity 5 Energy Basics

Energy: It is the ability to do work or cause change

الطاقة: هي القدرة على القيام بالعمل أو إحداث التغيير

Work: It is a force that causes an object to move a distance.

الشغل: هو القوة التي تجعل الجسم يتحرك لمسافة

Example shows the relation between energy and work مثال يوضح العلاقة بين الطاقة والعمل

When a football player kicks a ball, the force of his kick causes the ball move in a different direction. عندما يركل لاعب كرة كرة ، فإن قوة ركلته تجعل الكرة تتحرك في اتجاه مختلف

- Thus the player does work and he consumes energy (that he had obtained from food) to move his leg. هكذا يعمل اللاعب ويستهلك الطاقة (التي حصل عليها من الطعام) لتحريك ساقه

So, the work done by this player causes the ball to move.

لذا ، فإن العمل الذي يقوم به هذا اللاعب يتسبب في تحريك الكرة.

Facts about energy

Energy can be stored and changed from one form into another form.

يمكن تخزين الطاقة وتغييرها من شكل إلى شكل آخر.

Example: When you hold a book, it stores a potential energy, when you let it falls down to the ground, the book is moving where the potential energy changes into kinetic energy.

مثال: عندما تمسك كتابًا ، فإنه يخزن طاقة كامنة ، وعندما تتركه يسقط على الأرض ، يتحرك الكتاب حيث تتغير الطاقة الكامنة إلى طاقة حركية.

Most forms of energy can't be seen. لا يمكن رؤية معظم أشكال الطاقة.

Example: Sound energy, thermal energy, electrical energy and chemical energy are forms of energy that can't be seen.

مثال: الطاقة الصوتية والطاقة الحرارية والطاقة الكهربائية والطاقة الكيميائية هي أشكال من الطاقة لا يمكن رؤيتها.

When you push a wooden box and this box moves, this means that the energy transfers from you to the box and also can be measured through the distance

عندما تضغط على صندوق خشبي ويتحرك هذا الصندوق ، فهذا يعني أن الطاقة تنتقل منك إلى الصندوق وأيضًا يمكن قياسها من خلال المسافة

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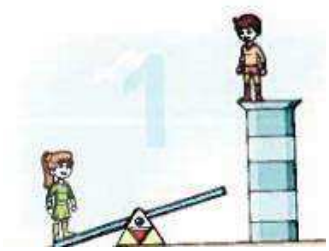
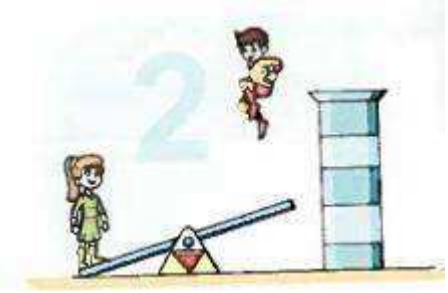
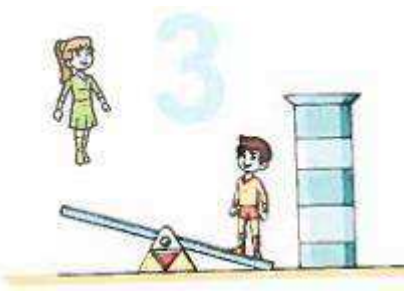
Activity 5 Kinetic and Potential Energy

Scientists classify energy into two types which are:

1. Potential energy الطاقة الوضع (الكامنة)	2. Kinetic energy الطاقة الحركية
It is the amount of energy that is store an object due to its position. هو مقدار الطاقة المخزنة في جسم ما بسبب موقعه	It is the energy of an object-due to its motion. إنها طاقة الجسم بسبب حركته
Example : when you lift ball up awa from the Earth's surface مثال: عندما ترفع الكرة بعيدًا عن سطح الأرض	Example : when you let it falls down t the ground مثال: عندما تتركه يسقط على الأرض
Examples 1-The boy on the tower has potential energy. 	Examples 2-When he jumps down, his potential energy is converted into kinetic energy. 
4-During the movement of the girl up i the air, her kinetic energy is converted gradually into potential energy 	4-The kinetic energy of the boy transfers t the girl who is standing on the seesaw and causes her to be pushed up into the air 

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Types of Energy

Energy is found everywhere around us.

Energy can be

1. Transferred تنقل	2. Transformed (changed)(تتحول (تغير
Energy is transferred from one place another. الطاقة تنتقل من مكان إلى آخر	Energy is continuously changing and transforming from one form into another for الطاقة تتغير باستمرار وتتحول من شكل إلى شكل آخر
Example when you kick a ball, kinetic energy your leg is transferred to the ball. مثال عند ركل الكرة ، يتم نقل الطاقة الحركية ساقك إلى الكرة	Example: When the roller coaster goes down the hill, its potential energy is transformed into kinetic energy مثال عندما تنزل السفينة الدوارة أسفل التل ، تتحول طاقتها الكامنة إلى طاقة حركية

Some changes of potential energy into kinetic energy

Example		Energy changes	
		From	Into
Flashlight		Chemical energy stored in batteries	Light energy and thermal energy (heat).
Gas oven		Chemical energy stored in natural gas.	Thermal energy
Spring-powered car toy		Potential energy stored in the spring wire	Kinetic energy, sound energy and thermal energy
Real car		Chemical energy stored in gasoline.	Kinetic energy

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Exercises on Lesson (2)

1-Choose the correct answer?

1.Human needs…… to walk from one place to another

a. light energy b . energy obtained from food

c. sound energy d. energy obtained from batteries

2.When you throw a stone in a lake, the …….is transferred from the stone to the water surface

a. potential energy b. pulling force

c. gravity force d. kinetic energy

3. A stopped object placed at 10 meters high from the Earth's surface has……. than the same object when placed at 5 meters high

a. smaller potential energy b. larger potential energy

c. smaller kinetic energy d. larger kinetic energy

4. When a ball on a certain height is left to fall down.

a its kinetic energy changes into potential energy b. its potential energy changes into kinetic energy

c. its potential energy remains as it is. d. its kinetic energy remains as it is

5.The form energy that can be seen is……. energy

a thermal b. electric c. light d. sound

6-The energy that is stored in an object due to its position, is known as …….energy

a. kinetic b. potential c. electric d. chemical

2. The following table shows Samy in different situations Choose from column (B) the type and the amount of energy that suits each situation in what suits it in column (A)

(A)	(B)
1- Samy stops at20 meter high	a. he has a stored electrical energy
2- Samy stops at 5 meter high	b. he does not have potential or kinetic energies
3. Samy stops at the ground	c. he has a large amount of kinetic energy
4.Samy walks slowly one the Earth's surface	d. he has a small amount of potential energy
5.Samy runs fast one the Earth's surface	e. he has a small amount of kinetic energy
	.f. he has a large amount of potential energy

1…….. 2…….. 3…… 4…….. 5…….

3- Put (√) or (X):

1.We eat food to obtain energy ( )

2. Energy doesn't transfer from an object to another ( )

3.Any moving object has a form of energy known as kinetic energy ( )

4. When an object is left to fall down to the Earth's surface, its potential energy is changed into kinetic energy ( )

5. We can measure the distance that an object moved as a result of pushing force ( )

6. To do work, you must push or pull an object for a certain distance ( )

7. As the height of an object from the Earth's surface increases ( )

8. When an object moves faster, it gains a larger amount of kinetic energy ( )

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4. Write the scientific term of each of the following:

1. The energy that is stored in an object due to its position at a certain height from the Earth's surface (……..)
2. The energy that the object gains due to its motion (……..)
3. The ability to do work or cause change (……..)
4. The force that makes an object to move over a distance (……..)
5. The energy that is changed into kinetic energy when an object falls down to the Earth's surface (……..)

5. Correct the underlined words

1.Your potential energy is transferred from your foot to a ball when you kick it(……..)
2. The ability to do force or cause change is known as energy (……..).
3. We cannot see all forms of energy, except thermal energy (……..)
4.As the object moves faster, its potential energy increases
5. The energy form stored in a stopped wooden box placed on a table is kinetic energy (……..)

6. Complete the following sentences

1. If you have the ability to push a chair, so you have …… .
2. When a force moves a bail moves over a distance we can say that ..……is done
3. When you kick a ball, the…… energy of your foot transfers to it. So, it moves through the air
4.When an apple falls from a tree, its……. energy will decrease
5. Some types of energy can be seen such as ……. energy, while some other types of energy can't be seen such as……..and……. energies
6. If an object is placed at a height above the Earth's surface, it stores ……energy
7. If a bird flies from the ground up to a high tree, its potential energy will …….
8. If you move a bag placed on a table to the floor, its potential energy will……

7. Give reasons for

1.The goal net vibrates when a ball hits it

……

2. A bird stops on a tree has energy

……

3.When a stone is thrown upwards, its potential energy increases

……

8. What happens if... ؟

1.An object is placed at a height from the Earth's surface (according to its potential energy)

……

2.An apple falls from a tree to the ground (according to the change in its energy)

……

3.You transfer a book from a lower shelf to a higher (according to its potential energy)

……

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Concept 2.3 Energy and Collision

Lesson (1) Collision

Collision: It is the crashing of two objects with each other

الاصطدام: هو تحطم جسمين مع بعضهما البعض

The wrecking ball: It is a heavy steel ball that swings on a cable

كرة التدمير: هي كرة فولاذية ثقيلة تتأرجح على كابل

The wrecking ball: It used in knock down building

كرة التدمير: تستخدم في هدم المبنى

When a train collide a car, the car damage as.

A heavy object has more energy (train) causes more damage for object has light low energy

عندما يصطدم قطار بسيارة ، فإن تلف السيارة مثل

الجسم الثقيل لديه طاقة أكبر (قطار) يسبب المزيد من الضرر للجسم الذي يحتوي على ضوء منخفض الطاقة.

As the speed and force of the collide object increase, the damage increases

مع زيادة سرعة وقوة الجسم الاصطدام ، يزداد الضرر.

Cricket game: A player use a wooden bat to hit a ball with high speed

لعبة الكريكيت: يستخدم اللاعب مضربًا خشبيًا لضرب الكرة بسرعة عالية.

The bat transfers its kinetic energy to the ball, its speed increases making pop sound

ينقل المضرب طاقته الحركية إلى الكرة ، وتزداد سرعته مما ينتج عنه صوت فرقعة.

When car driver stop the car suddenly, your body move forward

• عندما يوقف سائق السيارة السيارة فجأة ، يتحرك جسمك إلى الأمام.

Cars safety equipment : معدات سلامة السيارات

1-Car belts: They are used in cars to keep our bodies from car collision (move forward)

1- أحزمة السيارات: تستخدم فى السيارات لحماية أجسادنا من اصطدام السيارات (التحرك للامام).

2-Air bag وسادة (كيس) هوائي

Their structure Airbags are made up of thin nylon material folded into the steering wheel, seats, dashboard or doors. Idea of operation

::تتكون الوسائد الهوائية من مادة النايلون الرقيقة المطوية في عجلة القيادة أو المقاعد أو لوحة القيادة أو الأبواب .فكرة العملية

During collision, airbags inflate automatically when sensors in the car detect a crash

A sensor tells the airbags to inflate and fill with a gas to provide a soft cushion

أثناء الاصطدام ، تنتفخ الوسائد الهوائية تلقائيًا عندما تكتشف المستشعرات الموجودة في السيارة وقوع حادث يخبر المستشعر الأكياس الهوائية بالانتفاخ وتعبئتها بالغاز لتوفير وسادة ناعمة

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After collision, the airbags deflate almost as fast as they inflate, because they have -holes (vents) to allow them to deflate, so the driver can get out of the car.

بعد الاصطدام ، تفرغ الوسائد الهوائية بنفس سرعة انتفاخها تقريبًا ، لأنها تحتوي على فتحات (فتحات) للسماح لها بالتفريغ ، وبالتالي يمكن للسائق الخروج من السيارة.

Their importance أهميتها

Airbags slow the speed of the driver's motion forward. -Airbags absorb the - energy of the car on collision.)

- وسائد هوائية تمتص طاقة السيارة عند الاصطدام. تعمل الوسائد الهوائية على إبطاء سرعة حركة السائق للأمام.)

-Airbags slow the speed of the driver forward تبطئ الاندفاع الي الامام

-Airbags absorb the energy of the car due to its collision تمتص الصدمه الناتجه عن التصادم

Give a reason for

Airbags deflate quickly after few seconds of collision?

Because they contain small holes (vents), through which the gas comes out, so the driver can get out of the car

Collisions between trains and cars الاصطدام بين القطارات والسيارات

There are many accidents in which a train hits a car that may be stuck on the train tracks

هناك العديد من الحوادث التي يصطدم فيها قطار بسيارة قد تكون عالقة على سكة القطار

Trains are much larger than cars. Also, trains can travel at a high speed It is more dangerous, as the force of the collision between the car and train increases

القطارات أكبر بكثير من السيارات .أيضا ، يمكن للقطارات السفر بسرعة عالية وهو أكثر خطورة ، حيث تزداد قوة الاصطدام بين السيارة والقطار

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Concept 2.3

Exercises on Lesson (1)

1-Choose the correct answer?

1.When objects collide with each other ……..is transferred between them
a. time b. distance c. energy d. nothing

2.The object that has the most kinetic energy, is ……..object
a. the fastest and lightest b. the slowest and lightest
c. the fastest and heaviest d. the slowest and heaviest

3.When the cricket bat hits the ball, the ball direction…….. and the ball speed……
a. doesn't change - doesn't change. b. doesn't change - changes
c. changes - doesn't change. d. changes – changes

4.Collisions usually produce…… .
a. solar energy. b. sound energy
c. gravitational potential energy d. chemical potential energy

5. If there is nothing to stop a moving object, this object will ……
a. stay in motion b. stop after few hours
c. stop after few minutes d. stop after few seconds

6. Seatbelts work when the car……..
a. decreases its speed gradually. b. increases its speed gradually
c. suddenly stops d. stops gradually

7. When a car stops suddenly, the passengers move ……..
a. backward b. forward c . upward d. downward

8. Airbags in the car are folded into all the following places, except
a. steering wheel b. dashboard c. doors d. tires.

2. Choose from column (B) what suits it in column (A)

(A)	(B)
1- Wrecking ball	a. it is one of the safety equipment in cars that is inflated with a gas during crashes
2- Cricket bat	b. it changes its sound energy into light energy
3. Seatbelt	c. it is used to hit a ball during playing
4. Airbag	d. it is one of the safety equipment in cars that keeps passengers in their places during crashes
	e. it is used to hit a wall during destruction of a building

1…….. 2…….. 3…… 4……..

3- Put (√) or (X):

1. When a cricket bat hits the ball, its potential energy transfers to the ball ( )
2. Seatbelt is one of the safety equipment in cars. ( )
3. During a crash between two cars, the potential energy transfers from the faster car to the slower one ( )
4. After car collision, the airbags deflate as fast as they inflate ( )
5.When a fast car hits a very big tree, the kinetic energy of the car transfer into the tree ( )

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4.Write the scientific term of each of the following

A heavy steel ball that swings on a cable and is used in destruction of parts of buildings (……)

2. Safety equipment used to prevent car passengers from moving forward when the car stops suddenly. (……)

3. Safety equipment used to provide soft cushion when it is inflated automatically with a gas during collision of cars (……)

4.They are present in car airbags and allow them to deflate fast after collision (……)

5.Correct the underlined words

1.A fast and heavy object has more potential energy than a slow and light object (……)

2. Football is used to collide with buildings to knock down their walls. (……)

3. When a train at a high speed hits a car, the train gets more damage (……)

4. As a result of hitting the ball with the wooden bat, the speed of the ball doesn't change (……)

5. Seatbelts absorb the energy of the car due to its collision and gets inflated (……)

6. Airbags are made up of thick wooden material (……)

7. The cricket bat transfers its light energy to the ball (……)

6.Complete the following sentences:

1. When a bat hits a ball strongly, the ……energy of the bat is transferred to the ball and the speed of the ball ……

2.Among safety equipment which are used during collision of cars ……and ……

3.As a result of collision between the ball and the bat, the direction of the ball will……..

4. During a car crash, the…….. is inflated with a gas to provide a soft cushion

5. Airbags absorb the ……. of the car during collision

6. When objects collide with each other …….is transferred between them

7. In cars, the …….prevents passenger from moving forward when the car suddenly stops

7.Give reasons for

1.The speed of the ball increases when the bat hits it hard

……

2. Seatbelts in cars are very important

……

3.Airbags in cars are very important .

……

8. What happens if ……?

1.The moving cricket bat hits a ball (according to the transfer of energy)

……

2. Airbags in a car don't inflate during a crash. .

……

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Lesson (2) Basic of speed

speed distance traveled in time

To calculate the speed of any moving object, we can divide the distance that the object moves by the time taken to travel that distance:

$$\text{Speed} = \frac{\text{distance (km or meter}}{\text{time (second or hour)}}$$

So, we can define speed also as, distance per unit time.

The measuring unit of speed may be : Kilometer Per Hour (km/hr)
Or Meter Per Second (m/sec.)

The speed of an object is not affected by the direction of this moving object

Example If a car moves forward 5 meters in one second, then it moves backward 5 meters in one second, so its speed is still 5 meters per second.

Problems:

1-Amir runs 100 meters in 20 seconds. Calculate the speed of Amir

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{Speed} = \frac{100}{20} = = 5 \text{ m/sec}$$

-2- Bus travel 600 kilometers in 5 hours calculate the speed

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{Speed} = \frac{600}{5} = 120 \text{ km/h}$$

-Measure the distance that both objects travel in the same time	-Measure the time that both objects take to travel the same distance
The object that travels a greater distance in the same amount of time is moving at a greater speed. Example - If two runners run for 1 hour, where: - The first runner travels 6 kilometers. - The second runner travels 9 kilometers. So, the second runner is moving at a greater speed, because he travels a greater distance (9 km) in the same amount of time (1 hour)	The object that travels the same distance in a smaller amount of time is moving at a greater speed. Example - If two cars are racing 120 kilometers, where: - The first car reach the end line of race in 1 hour. - The second car reach the end line of race in 2 hours. So, the first car is moving at a greater speed, because it travels the same distance (120 kilometers) in a shorter time (1 hour)
-1قم بقياس المسافة التي يقطعها كلا الجسمين في نفس الفترة الزمنية -الجسم الذي	-2. قم بقياس الوقت الذي يستغرقه كلا الجسمين لقطع نفس المسافة -الجسم الذي يقطع

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نفس المسافة في فترة زمنية أقل يتحرك بسرعة أكبر - .مثال إذا كانت سيارتان تتسابقان لمسافة 120 كيلومترًا ، حيث - :أول سيارة تصل إلى خط نهاية السباق في ساعة واحدة - .تصل السيارة الثانية إلى خط نهاية السباق في غضون ساعتين .إذن ، السيارة الأولى تتحرك بسرعة أكبر ، لأنها تقطع نفس المسافة (120 كيلومترًا) في وقت أقصر (ساعة واحدة).	يقطع مسافة أكبر في نفس الوقت يتحرك بسرعة أكبر - .مثال إذا ركض اثنان من المتسابقين لمدة ساعة واحدة ، حيث - :أول عداء يسافر لمسافة 6 كيلومترات - . العداء الثاني يسافر 9 كيلومترات .إذن ، العداء الثاني يتحرك بسرعة أكبر ، لأنه يقطع مسافة أكبر (9 كم) في نفس الوقت (ساعة واحدة).

:Effect of speed on collision

- The kinetic energy of object depend on its speed تعتمد الطاقة الحركية للجسم على سرعته
- When the speed increases, the kinetic energy increases (more energy)

• عندما تزداد السرعة تزداد الطاقة الحركية (طاقة أكثر)

When a fast object hits another object

Energy transfer from fast object into collided object in form of heat, light or sound

عندما يصطدم جسم سريع بجسم آخر الطاقة تنتقل من جسم سريع إلى جسم مصادم في شكل حرارة أو ضوء أو صوت

Example: A fast tennis ball makes a louder sound than a slow ball on hits by racket(Kinetic energy converted into sound energy)

مثال: تصدر كرة التنس السريعة صوتًا أعلى من صوت الكرة البطيئة عند ضربات المضرب(تحويل الطاقة الحركية إلى طاقة صوتية)

Fast objects Slow objects

fast - moving object	slow - moving object
Have much energy لديه الكثير من الطاقة	Have less energy لديه قليل من الطاقة
They exert more force and more damage تبذل المزيد من القوة والمزيد من الضرر	They exert less force and less damage تبذل القليل من القوة والقليل من الضرر
The force causes a big damaged to the object that cannot be repaired تتسبب القوة في تلف كبير للجسم لا يمكن إصلاحه	The force causes a less damaged to the object that cannot be repaired than the fast moving object

Driving fast is very dangerous, because if a car increases its speed, its kinetic energy increases that results in exerting a large force during an accident

القيادة بسرعة شديدة الخطورة ، لأنه إذا زادت السيارة من سرعتها تزداد طاقتها الحركية مما ينتج عنه بذل قوة كبيرة أثناء وقوع حادث.

What happens if….?

ماذا يحدث إذا....؟

1-Two cars move at different speeds in opposite directions with each other? collide

1- سيارتان تتحركان بسرعات مختلفة في اتجاهين متعاكسين تصطدمان ببعضهما البعض؟

The forces exerted in the accident depend on the speed of both cars, so damage would be much more severe because they move in opposite direction

تعتمد القوى المؤثرة في الحادث على سرعة كلتا السيارتين ، لذا فإن الضرر سيكون أشد بكثير لأنهما يتحركان في الاتجاه المعاكس.

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2-Two cars move at different speeds in the same direction collide with each other

The forces exerted in the accident depend on the speed of both cars, this leads to damage that would be less severe because they move in the same direction

-سيارتان تتحركان بسرعات مختلفة في نفس الاتجاه تصطدم ببعضهما البعض تعتمد القوى المؤثرة في الحادث على سرعة السيارتين ، وهذا يؤدي إلى ضرر أقل شدة لأنهما يتحركان في نفس الاتجاه.

Activity 7 Racing Downhill التسابق على المنحدرات

Measure the speed and the kinetic energy of an object moving down a cardboard tube at various incline angle

قم بقياس السرعة والطاقة الحركية لجسم يتحرك لأسفل أنبوب من الورق المقوى بزاوية ميل مختلفة

Tools Cardboard paper towel tube – Books- Scissors -Metric ruler Stopwatch - Paper cup

أدوات المناشف الورقية من الورق المقوى - كتب - مقص - مسطرة متري ساعة توقيت - كوب ورقي

Steps

Part (1): The relation between the speed and the angle of inclination.

1. Put one end of the tube on the top of two books and the other end of the tube resting on the ground
2-Record in a table the number of books used to set up the tube in the "column "Number of books
3-Roll the truck down the tube. Use the stopwatch to determine the time and record in the table how long the truck takes to travel to the end of the tube in the column "Time to travel"
4. Add one book to change the incline angle and repeat the steps, then add another book and repeat the steps again

Part (2): The relation between the kinetic energy and the angle of inclination

1-Now, repeat the activity as in part (1), but place the paper cup at the bottom of the tube as shown in the figure
6-Measure the distance the cup moves each time after the truck rolls into it, and record in the table the distance that the cup travels in the column "Distance the cup traveled

Observations As the "Distance the cup traveled" is longer, the kinetic energy of the toy truck greater

As the angle of inclination increases, the speed of the truck increases as it takes less time to reach the end of the tube.-

Conclusions As the angle of inclination increases the distance that the paper cup traveled

Both speed and kinetic energy increase, as the angle of inclination increases

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Exercises on Lesson (2)

1-Choose the correct answer?

1. When two objects of the same mass move with the same speed collide with each other, the resulted damage…….

.a. is larger in one of them and smaller in the other. b. is equal in both of the two objects
c. doesn't depend on the mass of the two objects d. doesn't depend on the speed of the two objects

2. On collision energy is……..

a. created b. destroyed c. created and transferred d. transferred and change

3. How can we calculate the speed of an object

a. Speed =distance ÷time b. Speed= distance x time
c. Speed= distance + time d. Speed= distance - time

4.Which of the following is a measuring unit of speed

a. hr/km b. sec/m c. kg/sec d. m/sec

5. What is the speed of a car that travels 400 meters in 4 second?

a. 100 m/sec b. 20 m/sec c. 30 m/sec d. 40 m/sec

6.As the angle of a ramp decreases, the speed of a toy car rolling on it……and its kinetic energy.....

a. increases - decreases b. increases – increases
c. decreases - decreases d. decreases- increases

7.An object keeps moving with same speed when

a. its kinetic energy decreases b. its potential energy increases
c. no another force stops it. d. another object collides with it

8. The two factors affecting the kinetic energy of an object are

a. its speed and the color b. its mass and the color
c. its speed and the mass. d. its light and the sound energies.

9.The mass of an object

a. doesn't affect its potential energy or its kinetic energy.
b. affects its potential energy and its kinetic energy
c. affects its potential energy only. d. affects its kinetic energy only.

2. Choose from column (B) what suits it in column (A)

(A)	(B)
1- A heavy object that doesn't move	a. has much kinetic energy
2- A light object that doesn't move	b. has much light energy
3. A fast object with a heavy mass	c. if it moves with a fast speed, it has much kinetic energy
4. A slow object with a light mass	d. . has low kinetic energy
	e. if it moves with a low speed, it has low kinetic energy

1…….. 2…….. 3…… 4……..

3- Put (√) or (X):

1. Fast-moving objects can be exposed to less damage than slow ones ball ( )
2. A slow and light object has much kinetic energy. ( )

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3. We cannot create a new form of energy and also we cannot destroy an existing form of energy ( )
4.You have to drive a car as fast as possible, because at high speeds you can avoid collisions ( )
5.To increase the speed of a moving object, you can collide it with another object that moves in the opposite direction. ( )
6. When two heavy and fast cars move in opposite directions collide together they produce very small amount of damage. ( )
7. If two objects cover the same distance in the same time so, they have similar speed( )
8. We can measure the covered distance in kilometer unit . ( )
9. If car (A) covered a distance of 100 kilometers in one hour and car (B) covered a distance of 100 kilometers in two hours so, car (B) is faster than car (A) ( )
10. The angle of inclination of a ramp affects the speed of an object moving on it ( )

4.Write the scientific term of each of the following

The process in which two objects or more crash into each other and including an energy transfer (……)
2. The energy that can be heard and usually produced when two objects collide with each other (……)
3. The liquid that stores chemical energy and used to move cars. (……)
4. The distance that an object traveled in a certain amount of time. (……)

5. Correct the underlined words

1.When two cars collide with each other, the potential energy transfers from the faster car to the slower car (……)
2. The speed of an object affects its potential energy. (……)
3. Two objects of the same mass and placed at the same height have the same kinetic energy .(……)
4. When the speed of an object increases, its kinetic energy decreases(……)

6.Give reasons for

1.When two objects collide with each other, you can hear a sound .
……
2-Driving fast is very dangerous .
……

7.What happens if ... ?

1. The speed of a car increases(according to its kinetic energy)
……
2.Two bicycles move in an opposite direction, collide with each other. .
……

8.Find the speed of a runner, if you know that he covers 400 meters in 8 seconds.

……

9.A train travels from Cairo to Alexandria in a distance of 200 kilometers in 2 hours Find its speed.

……

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Lesson (3) energy and collisions

الطاقه و التصادم

Energy and collisions — الطاقة والاصطدامات

crash with each other, we can say a Collision. When two objects happens between them. عندما يصطدم جسمان ببعضهما البعض ، يمكننا القول أن تصادمًا يحدث بينهما

Collision It is the moment where two objects hit or make contact in a forceful way : الاصطدام: هي لحظه تلامس جسمان بطريقه قويه

When two objects collide with each other , عندما يصطدم جسمان مع بعضهما البعض ،
an energy transfer occurs and changes of energy occur .
يحدث نقل للطاقة وتحدث تغيرات في الطاقة.

Example of collision مثال على الاصطدام

1- what happens if you are running down the street without looking in front of you and hit a traffic sign post
1- ماذا يحدث إذا ركضت في الشارع دون النظر أمامك واصطدمت بإشارة المرور

In this situation: You will stop moving forward
في هذه الحالة: • ستتوقف عن الحركة للأمام

- You may bounce off and get hurt. ترتد للخلف وتصاب بجرح
- The traffic sign post may vibrate يهتز عمود إشارة المرور

what are the changes and transfer of energy that take place
ما هي التغييرات ونقل الطاقة التي تحدث ،

kinetic energy transfers from your body to sign post
your kinetic energy changes into sound energy
تنتقل الطاقة الحركية من جسمك إلى لافتة المرور ويؤدي هذا إلى تغيير الطاقة الحركية إلى طاقة صوتية

Activity 5 Effect of Speed on Collisions تاثير السرعه علي التصادم

as inclined of the slope increases, speed of object increases. effect of speed on collisions of an object increases kinetic energy of this object increases .
كلما زاد ميل المنحدر ، تزداد سرعة الجسم. يزيد تأثير السرعة على اصطدام الجسم من الطاقة الحركية لهذا الجسم

amount of kinetic energy of object depends on its speed When a speeding object hits another object , the speeding object By increasing speed of object , energy that it transfers during collision will increase
وتعتمد كمية الطاقة الحركية لجسم ما على سرعته عندما يصطدم جسم مسرع بجسم آخر ، فإن الجسم المسرع عن طريق زيادة سرعة الجسم

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Some of this transferred energy may be in the form of heat, light or sound.

، فإن الطاقة التي ستنتقل أثناء الاصطدام. . قد يكون بعض هذه الطاقة المنقولة في شكل حرارة أو ضوء أو صوت.

Comparison between a fast - moving object and a slow - moving object

مقارنة بين جسم سريع الحركة وجسم بطيء الحركة

fast - moving object - جسم سريع	slow - moving object جسم بطيء
It has more force قوه اكبر It has more energy طاقة اكبر This force causes a big damage cannot be repaired . هذه القوة تسبب ضررا كبيرا لا يمكن اصلاح	It has less force قوة أقل - It has less energy طاقة أقل This force causes less damage to the object هذه القوة تسبب ضررًا أقل للجسم

Driving fast is very dangerous, القياده السريعه خطر جدا

if a car increases its speed, its kinetic energy increases that results in الناتج large force قوه كبيره during an accident حادث

what happens if ماذا يحدث إذا

1-two cars move at different speeds in an opposite direction collide with each other?

اذا زادت السيارة من سرعتها ، تزداد طاقتها الحركية مما ينتج عنه قوة كبيرة

The forces exerted in the accident depend on the speed of both cars , so the damage would be much more severe because they move in opposite direction

تعتمد القوى الناتجه عن الحادث على سرعة كلتا السيارتين ، وبالتالي فإن الضرر سيكون أشد وخطير لأنهما يتحركان في الاتجاه المعاكس.

2-Two cars move at different speeds in the same direction collide

-سيارتان تتحركان بسرعات مختلفة في نفس الاتجاه في نفس يجعل تصطدم

The forces exerted in the accident depend on the speed of both cars , this leads to damage would be less severe because they move in same direction

القوى المؤثرة فى الحادث تعتمد على سرعة السيارتين وهذا يؤدى الى ضرر اقل شدة لانهما يتحركان فى نفس الاتجاه

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Exercises on Lesson (3)

1-Choose the correct answer?

1. When the speed of a moving object increases, the energy that transfers during its collision will

.a. Increase b. decrease c. not change d. equal zero

2-A fast-moving object has ..... that of a slow-moving object

a. the same energy as b. more energy than c. less energy than d. no energy as

3-The two factors affecting the kinetic energy of an object are…….

a. its speed and color b. its mass and color

c. its speed and mass d. its light and sound energies

4-As the mass of a vehicle increases, it needs..... to gain

a. less force-less potential energy b. more force - more potential energy

.c. less force-less kinetic energy d. more force - more kinetic energy

5-When two objects of the same mass move with the same speed collide with each other, the resulted damage

.a. is larger in one of them and smaller in the other

.b. is equal in both of the two objects c. doesn't depend on the mass of the two objects

.d. doesn't depend on the speed of the two objects

6-On collision, energy is……

a. created b. destroyed c. created and transferred d. transferred and changed

7-When car and truck collide with each other in opposite directions

.a. the car has more energy and causes more damage

.b. the truck has more energy and causes more damage

.c. the car has less energy and causes more damage

.d. the truck has less energy and causes less damage

8-All the following factors affect the kinetic energy of a moving car, except

.a. the mass of the car b. the pushing force of the car engine

.c. the airbags inside the car d. the inclination of the road on which the car moves

9-The mass of an object

.a. doesn't affect its potential energy or its kinetic energy

.b. affects its potential energy an its kinetic energy

.c. affects its potential energy only d. affects its kinetic energy only

2. Choose from column (B) what suits it in column (A)

(A)	(B)
1- A heavy object that doesn't move	a. has much kinetic energy
2- A light object that doesn't move	b. has much light energy
3. A fast object with a heavy mass	c. if it moves with a fast speed, it has much kinetic energy
4. A slow object with a light mass	d. . has low kinetic energy
	e. if it moves with a low speed, it has low kinetic energy

1…….. 2…….. 3…… 4……..

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3- Put (√) or (X):

1. Fast-moving objects can be exposed to less damage than slow ones ball ( )
2. A slow and light object has much kinetic energy. ( )
3. We cannot create a new form of energy and also we cannot destroy an existing form of energy ( )
4. You have to drive a car as fast as possible, because at high speeds you can avoid collisions ( )
5. To increase the speed of a moving object, you can collide it with another object that moves in the opposite direction. ( )
6. When two heavy and fast cars move in opposite directions collide together they produce very small amount of damage. ( )
7. If two objects cover the same distance in the same time so, they have similar speed( )
8. We can measure the covered distance in kilometer unit . ( )
9. If car (A) covered a distance of 100 kilometers in one hour and car (B) covered a distance of 100 kilometers in two hours so, car (B) is faster than car (A) ( )
10. The angle of inclination of a ramp affects the speed of an object moving on it ( )

4. Write the scientific term of each of the following

The process in which two objects or more crash into each other and including an energy transfer (……)
2. The energy that can be heard and usually produced when two objects collide with each other (……)
3. The liquid that stores chemical energy and used to move cars. (……)
4. The distance that an object traveled in a certain amount of time. (……)

5. Correct the underlined words

1. When two cars collide with each other, the potential energy transfers from the faster car to the slower car (……)
2. The speed of an object affects its potential energy. (……)
3. Two objects of the same mass and placed at the same height have the same kinetic energy .(……)
4. When the speed of an object increases, its kinetic energy decreases(……)

6. Give reasons for

1. When two objects collide with each other, you can hear a sound .

…….

2- Driving fast is very dangerous .

…….

7. What happens if ... ?

Two bicycles move in an opposite direction, collide with each other. .

…….

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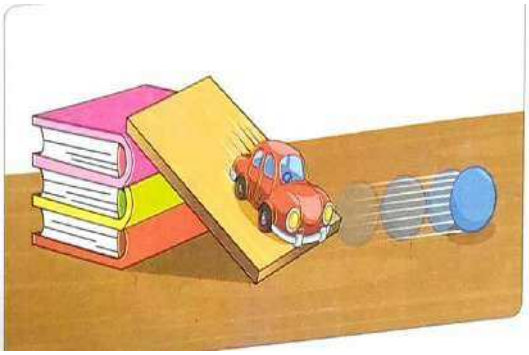
Lesson (4) Speed and collisions

السرعه و التصادم



Look at this picture which represents a toy car collides with small ball .

انظر إلى هذه الصورة التي تمثل سيارة لعبة تصطدم بكرة صغيرة.

1-By increasing speed of the car , the kinetic energy of this car increases

1-بزيادة سرعة السيارة تزداد الطاقة الحركية لهذه السيارة

2. The ball moves a distance due to force and speed of the car

2. تتحرك الكرة مسافة بسبب قوة وسرعة السيارة

3- By increasing the force of an object and By increasing the speed of an object The kinetic energy of the object increases

3- بزيادة قوة الجسم وزيادة سرعة الجسم تزداد الطاقة الحركية للجسم

4- as the force of moving object and the speed of moving object increase The kinetic energy of the object increases during collision

4- كلما زادت قوة الجسم المتحرك وسرعة الجسم المتحرك تزداد الطاقة الحركية للجسم أثناء الاصطدام

5- as kinetic energy of the object increases during collision more damage will happened to the object

5- كلما زادت الطاقة الحركية للجسم أثناء الاصطدام ، سيحدث المزيد من الضرر للجسم

The Effect of Mass on Collisions تأثير الكتلة على الاصطدامات

The relation between the mass of object and its kinetic energy

العلاقه بين كتلة الجسم وطاقته الحركية

If a large truck is traveling at the same speed of a car

- إذا كانت شاحنة كبيرة تسير بنفس سرعة السيارة

Truck has more energy than car so the truck needs bigger engine than car

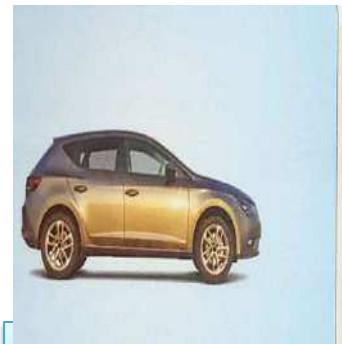
- الشاحنة لديها طاقة أكثر من السيارة لذلك تحتاج الشاحنة إلى محرك أكبر من السيارة

As the car moves faster the amount of fuel that burn inside the engine increases to provide it with more kinetic energy

- كلما تحركت السيارة بشكل أسرع زادت كمية الوقود التي تحترق داخل المحرك لتزويدها بطاقة حركية أكبر

As the mass of an object increases is kinetic energy increase

- مع زيادة كتلة الجسم تزداد الطاقة الحركية



The car :
- Has a small mass.
- Has a small engine.
- Uses less fuel.
- Has less kinetic energy.

The truck :
- Has a big mass.
- Has a big engine.
- Uses more fuel.
- Has more kinetic energy.

Mr. Ahmed Nadrous
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The effect of mass on collisions تاثير القوه علي السرعه

A large mass ca causes more damage when it hit something than a small - mass car traveling at the same speed . .

تسبب الكتلة الكبيرة مزيدًا من الدمار عندما تصطدم بشيء أكثر من سيارة ذات كتلة صغيرة تسير بنفس السرعة. .

what happens if ? ماذا يحدث إذا ؟

1. A bicycle moves at a speed of 50 km/h hits a person .

The bicycle will cause some injuries to this person but he will survive

دراجة تتحرك بسرعة 50 كم / ساعة تصطدم بشخص ما. ستسبب الدراجة بعض الإصابات جروح لهذا الشخص لكنه سينجو لكنه سيعي

2. A car moves at a speed of 50 km/h hits a person

The life of this person may be endanger .

2. سيارة تتحرك بسرعة 50 كم / ساعة تصطدم بالإنسان

قد تكون حياة هذا الشخص في خطر

Activity 10

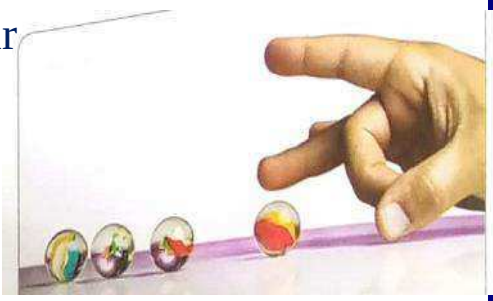
energy conversion during collision

تحول الطاقه عند التصادم

1-When you push marble kinetic energy of your hand transfer to marble

2-during collision between marbles kinetic energy transfer to sound energy

3-energy transfer from first marble to second marble



1- -عند دفع بليه الطاقة الحركية لديك في يدك تنقل إلى البليه 2- أثناء الاصطدام بين الكرات الطاقه الحركيه تتحول الي صوت

3- تنتقل الطاقة من االبليه الأولي إلى البليه الثانيه

Energy conversion during collision of Newton's cradle تحول الطاقه في لعبه نيوتن

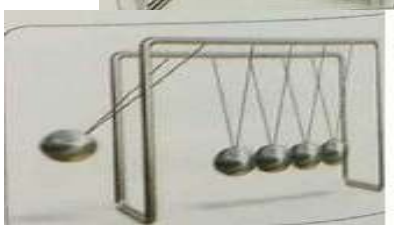
• When Newton's cradle ball is raised up عندما ترفع لعبه نيوتن it stores potential energy and has not any kinetic energy

تخزن طاقه الوضع ولا يكون لديها أي طاقه حركية

• When you leave ball moves in direction of rest balls, potential energy decreases and changes into kinetic energy

• عندما تترك الكرة تتحرك في اتجاه باقي الكرات تنخفض طاقه الوضع وتتغير الي طاقه حركه

*



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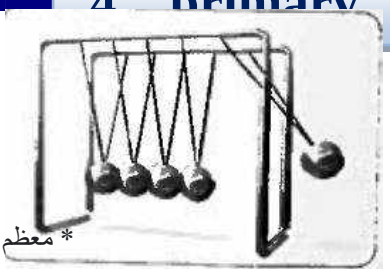

Most of kinetic energy in Newton's cradle is transferred from first ball to rest of balls, so number of balls moving on both sides is equal.

* معظم الطاقة الحركية في اللعبه تنتقل من الكرة الأولى إلى باقي الكرات ، وبالتالي عدد الكرات التي تتحرك على كلا الجانبين يكون متساوٍ.

*Some of kinetic energy of the first ball is changed into other forms of energy such as sound energy and thermal energy that are produced during collision, where:

يتم تغيير بعض الطاقة الحركية للكرة الأولى إلى أشكال أخرى من الطاقة مثل الطاقة الصوتية والطاقة الحرارية التي يتم إنتاجها عند التصادم الطاقة الحركية تتحول إلى طاقة صوتية

Some of this kinetic energy changes into sound energy

Some of this kinetic energy changes into thermal energy that is produced due to e friction between the string and the other parts of Newton's cradle and also during collision between balls.

تتحول الطاقة الحركية إلى طاقة حرارية تنتج عن الاحتكاك بين الخيط وأجزاء أخرى من اللعبه وأيضًا أثناء الاصطدام بين الكرات.

Some of this kinetic energy changes into other forms of energy due to the friction of air with the ball during its movement .

- يتغير جزء من هذه الطاقة الحركية إلى أشكال أخرى من الطاقة بسبب احتكاك الهواء بالكرة أثناء حركتها.

Notes if you leave the moving balls of Newton's cradle long enough their energy decreases until they stop

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Exercises on Lesson (4)

1-Choose the correct answer?

1)A very big truck needs…….. to move

a .very small engine b. small engine c. very big engine d .no engine

2. As the force that acts on an object increases, its ability to do work……

a. increases b. decreases c. doesn't change. D.destroyed

3. The amount of fuel that is used in a big truck to produce a certain amount of kinetic energy is…… the amount of fuel used in a small car to get the same amount of kinetic energy.

a. less than b. equal to c. more than d. half to

4. On a flat road, if a large truck is traveling at the same speed of a small car, then the truck has……..

a. kinetic energy. b. less kinetic energy.

c. the same kinetic energy of the car d. no kinetic energy at all.

5. When a car stops, all the following become zero, except……

a. speed. b. kinetic energy. c. mass d. work

6. When a moving car decreases its speed and then stops, so……..

a. Its kinetic energy becomes zero.

b. Its light energy only becomes zero.

c. Its light energy and thermal energy become zero.

d. Its kinetic energy becomes equal to its thermal energy.

7. If two objects collide with each other, the energy after collision is…….. the energy before collision.

a. Triple b. Double c. Half d. equal to

8. When two balls are pushed away at the left side of Newton's cradle, this happens as a result of the collision of…… from the right side

a. One ball b. Two balls c. three balls d. four balls

9In Newton's cradle, when you move a ball away from the others and do not let it go, so that which is stored in this ball.

a. your potential energy is changed into kinetic energy

b. your kinetic energy is changed into potential energy

c. your sound energy is changed into kinetic energy

d. your sound energy is changed into potential energy

10. The kinetic energy in Newton's cradle travels through the balls in collision. At each

a. three different directions b. two opposite directions

c. the same direction of movement d. the form of chemical energy

11. When you throw a ball of clay strongly at a wall, there is……

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a. no damage occurs to the ball. b. strong damage occurs to the ball.
c. energy is destroyed. d. energy is created

12. At the same speed, a large mass object has more energy than a small mass object.

a. less potential energy b. more potential energy
c. less kinetic energy d. more kinetic energy

2. Choose from column (B) what suits it in column (A):

(A)	(B)
1. Large-mass vehicle with speed 100 km/hr 2. Small-mass vehicle with speed 20 km/hr 3. Small-mass vehicle that doesn't move	a. It has a large amount of kinetic energy. b. It has no kinetic energy. c. It has the most sound energy. d. It has a small amount of kinetic energy.

1…….. 2…….. 3……

3)Put (v) or (X):

1. A small object moving at a low speed has a large amount of kinetic energy. ( )
2. The force that acts on an object doesn't affect its speed. ( )
3. The smaller the mass of the vehicle, the less fuel it consumes. ( )
4 . objects of equal masses and move at different speeds have the same amount of kinetic energy( )
5. Speed and mass are the factors that affect the kinetic energy of a moving Objects ( )
6)The moving balls in Newton's cradle will stop after lots of collisions because their kinetic energy is destroyed. ( )
7)Some Kinetic energy is changed during collisions of balls in Newton's cradle, eto sound and thermal energies. ( )
8. Among the forms of energy that don't exist in Newton's cradle during collisions are light and chemical energies. ( )

4)Correct the underlined word:

1.A two-tons truck has smaller amount of kinetic energy than that of one-ton truck moving at the same speed.
2. All moving objects always have light energy.
3. The larger the mass of a car, the less fuel it consumes.
4. The distance that the balls move on the two opposite sides on Newton's cradle Increases gradually as time passes.
5. In Newton's cradle, the kinetic energy of moving balls increases as time passes. (

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6. The number of moving balls at one side on Newton's cradle must be more than those moving at the other side. (

5)Complete the following sentences:

1. By increasing the force that acts on a moving object, its ……increases that causes the increase of its…….. energy.
2. A car moving with speed 50 km/hr has a…… kinetic energy than that of a truck moving with the same speed.
3. In vehicles, the …… energy that is stored in the fuel changes into ……..
energy that allows them to move.
4. Most of the…… energy in the Newton's cradle is transferred from the first ball to rest of balls.
5. When a marble hits another one, some of…… energy changes into…….. energy which you can hear.
6. During collision between Newton's cradle balls, some of…… energy changes into ……..energy due to the…….. between the string and the other parts of the cradle.
7. Due to …….of air with Newton's cradle balls, some of …… energy changes into other forms of energy.
8. In Newton's cradle, when you rise up one ball, it stores ……. energy that changes into……..energy when you leave the ball to move.
9. The…….. energy decreases gradually when you leave the moving balls of Newton's cradle long enough until they……..

6 Give reasons for:

1. A truck needs a bigger engine than that of a small car to move with the same speed.

……

2. A car consumes less fuel than that consumed by a bus to move at the same speed.

……

3. You can hear a sound during collision between marbles.

……

4. The amount of energy before collision is equal to the amount of energy after collision.

……

7 What happens if ...?

1. The pushing force that acts on an object decreases.
(according to its kinetic energy).

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……

2. The kinetic energy of a moving car increases.
(according to the damage during collision).

……

3. A truck and a small car move at the same speed. (according to kinetic energy).

……

4. The Newton's cradle ball is raised up without leaving it go.
(according to its energy).

……

5. You let the ball of Newton's cradle move towards the rest of balls.
(according to the change of energy).

……

6. Friction occurs between the string and the other parts of Newton's cradle during collision, (according to the change of energy)

……
……

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